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TELECOURSE AND TRADITIONAL  
COMPUTER APPLICATIONS --  
EXPLORING THE IMPACT OF REVIEW SESSIONS

by

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A dissertation submitted in partial fulfillment of the  
requirements for the degree of Doctor of Education  
in the Department of Educational Foundations  
in the College of Education  
at the University of Central Florida  
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## ABSTRACT

The purpose of the study was to explore the effects of review sessions on student achievement and retention in a computer applications course taught by televised distance learning and traditional instruction. Identified within the study were method of instruction, review, and grades in televised and traditional computer applications courses.

A quasi-experimental design was used to measure the effects of review sessions on student achievement and retention in computer applications classes. Intact classes were used to form the 4 groups used in this study. Randomization was limited to choices students made in registering for the classes. The control groups for this study consisted of those students enrolled in traditional and telecourse computer applications during the Fall 1995 and Spring 1996 semesters for a total of 137 students. These students received no review sessions as part of their instruction. The experimental groups were formed by those students enrolled in the traditional and telecourse computer applications during the Fall 1996 semester for a total of 102 students. These students received review sessions as part of their instruction.



Findings indicated that method of instruction does not provide significant differences in terms of grades and retention between the telecourse and traditional classes. Results indicated that there were significant differences in terms of review on grades with telecourse and traditional classes. Student responses indicated that review sessions were helpful.

Recommendations were made for improved efforts to enhance teaching strategies in traditional and distance learning and for continued research in traditional and distance learning.



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## CHAPTER I

### INTRODUCTION

Education ranks as the number one priority among American voters according to Jeremy Rifkin (1996), president of the Foundation on Economic Trends in Washington, DC, with 67% of those surveyed saying it is a major concern. The primary mission of the community college is to serve community needs; however, Daniel Moriarty (1996), chair of the American Association of Community Colleges, states the definition of "community" has expanded considerably in recent years and along with a broader definition comes a greater sphere of influence within the community. The challenge then is for community colleges to continue to fulfill their mission to their communities and country under these expanding expectations by exploring various educational opportunities while addressing quality of programs. Moriarty (1996) comments that community colleges have an historical reputation of responsive, flexible service with quality instruction and current demands should not jeopardize that rich history. With this in mind, community colleges have been exploring various traditional



and distance learning alternatives to enhance instructional opportunities for students.

Distance education has existed as an alternative to traditional classroom instruction since the mid-1800s (Lever, 1993, p. xi). The structure of distance education courses evolved in accordance with the trends and changes in traditional education. Widespread and growing interest during the past twenty years has resulted in diverse and creative distance education systems. The main factor which has contributed to the interest in distance education is the emergence of sophisticated communications technology. Without the communications network to transmit information, there would not be the current interest and development of distance education. Technology that exists today awaits imaginative educators and leaders to design accessible and supportive distance education systems.

Community colleges are especially anxious to utilize various teaching technologies to improve the quantity and quality of their productivity (Monaghan, 1995, p. A17). Distance education takes the value and objectives of traditional courses and uses technologies of the Information Age to address the needs of a broader and more complex educational market (Kelly, 1990).

Schools have explored mechanisms to provide for a variety of delivery systems for courses and programs. At Chadron State College in Nebraska, maturing distance



learning technologies have become attractive alternatives to physical travel of students distributed over a large geographic area and with varying academic needs (Weiss, 1993). Generally records, audio tapes, slides, and films have been the resources used both in distance learning courses for instructional content in correspondence courses, telecourses, audio courses, and independent study courses. As technology continues to move forward, new innovations are being developed. Telecommunications has become a viable means of delivering educational programs to students who cannot attend traditional courses. Unlike previous technologies, telecommunications provides access at reasonable cost with varying times and locations and is interactive providing the potential to offer a solution to help solve educational problems related to access, cost, time, place, and interactivity (Willis, 1994). Schools are exploring options for students interested in the distance learning approach to coursework. Administrators and teachers realize that barriers sometimes prevent students from attending regularly scheduled classes at campus locations. Work schedule conflicts, transportation problems, babysitting difficulties, physical disabilities, and conflicting class offerings are some of the reasons students do not enroll in courses.



### Brevard Community College

In order to better serve the needs of the community, Brevard Community College in Florida is expanding traditional and distance learning options. Courses are offered at each of the four campus locations and at two centers during the day, evening and weekends with special sessions introduced within a term. Annenberg/CPB (1992) lists Brevard Community College as one of 22 model programs in the Going the Distance Project. Telecourses are being purchased or created and integrated into the curriculum. These courses have been designed specifically for the distance learning market. Courses are broadcast over the local public television network or college television network. Usually telecast times are repeated twice during a given week, once during the day and once during the evening to accommodate varying work schedules. Brevard Community College encourages students to tape broadcasts in order to meet individual needs. This permits students with video recorders to set the time and tape each telecast for viewing or reviewing. Videotapes are available for viewing at campus library locations for additional access. Videotaped programming of courses is expanding with the goal at Brevard Community College to offer a complete set of courses leading to an associate in arts degree via the television. Teachers and administrators currently are researching how best to address this feature for laboratory courses. Students may



be required to travel to a campus location near them in order to conduct experiments under monitored lab conditions.

With the increased number of course offerings through distance learning, concern is given to students who do not perform at acceptable levels, and also to students who withdraw from courses. These are the same concerns which are seen within traditional course offerings. Table 1 illustrates the withdrawal rates for all telecourse and traditional courses offered at Brevard Community College within the past three years.

TABLE 1  
WITHDRAWAL RATES AT BREVARD COMMUNITY COLLEGE  
ALL COURSES

ACADEMIC YEAR	TELECOURSES	TRADITIONAL COURSES
1993-94	18.74%	9.96%
1994-95	19.79%	8.99%
1995-96	21.67%	9.83%

Withdrawal rates for the telecourses was approximately twice that for traditional classes offered the same year.

Table 1 provides the framework by illustrating the broad overview of withdrawals for all telecourses and traditional courses offered at the college. Next, Table 2



narrows the focus and illustrates the withdrawal rates for computer general studies courses offered by telecourse and traditional instruction offered at Brevard Community College within the past three years.

TABLE 2  
WITHDRAWAL RATES AT BREVARD COMMUNITY COLLEGE  
CGS\* 1000 AND CGS 1530

ACADEMIC YEAR	TELECOURSES	TRADITIONAL COURSES
1993-94	14.91%	8.88%
1994-95	19.73%	8.19%
1995-96	20.83%	8.39%

\*Computer General Studies

As illustrated in Table 2, the percentage of withdrawals from computer courses parallels all telecourse and traditional course offerings. Approximately twice the percentage of students are withdrawing from telecourse classes which is seen in Table 1 for all courses as well as in Table 2 for computer general studies courses.

Failure rates for all telecourse and traditional courses offered at Brevard Community College for the past three years are reflected in Table 3.



TABLE 3

## FAILURE RATES (GRADE OF F) AT BREVARD COMMUNITY COLLEGE

ACADEMIC YEAR	TELECOURSES	TRADITIONAL COURSES
1993-1994	13.99%	8.67%
1994-1995	16.04%	8.50%
1995-1996	14.13%	8.23%

Failure rates for all telecourses are higher than those for traditional classes as illustrated in Table 3.

Using the figures from all courses for the broad conceptual view, Table 4 next illustrates the failure rates of computer general studies courses offered at Brevard Community College for the past three years.

TABLE 4

## FAILURE RATES (GRADE OF F) AT BREVARD COMMUNITY COLLEGE

## CGS 1000 AND CGS 1530

ACADEMIC YEAR	TELECOURSES	TRADITIONAL COURSES
1993-1994	13.04%	8.75%
1994-1995	15.65%	10.57%
1995-1996	11.90%	8.85%



Computer courses shown in Table 4 reflect similar failure rates compared with overall courses offered by telecourse and traditional means. Student written responses on course evaluations of telecourses have suggested that review sessions would be helpful to the students as they attempt to master course content. Further, student comments regarding the benefit of class review sessions in traditional classes prompted interest in this study.

### Purpose

The purpose of this study was to explore the effects of review sessions on student achievement and retention in a computer applications course taught by televised distance learning and traditional instruction.

### Justification for the Study

Higher education today is faced with the challenges of expanding the quality and effectiveness of student learning (PBS, 1992). This indicates that higher education must not only be concerned with existing courses taught in the traditional manner, but with courses extending into the distance learning arena. Student success and retention are of concern to institutions of higher learning. Dille and Mezack (1991) indicate that completion rates of distant learners are typically half that for courses offered through traditional delivery methods. Cheng, Lehman, and Armstrong



(1991) concur by stating that course non-completion and dropout rates for distance learning classes have been typically high.

### Research Questions

The study examined the effects of the use of review sessions on student achievement and retention in distant learning and regular class presentations by addressing the following research questions:

1. How do student grades in televised computer applications courses compare with student grades in traditional computer courses?
2. How does student withdrawal in televised computer applications courses compare with student withdrawal in traditional computer applications courses?
3. Would student grades in computer applications telecourse and traditional courses improve with the addition of review sessions?
4. Would student retention in computer applications telecourse and traditional courses improve with the addition of review sessions?
5. What are student reactions to review sessions?

This study was conducted using the researcher's traditional computer applications classes and telecourse computer applications class for one semester and comparing



the control sample group data on grades/completion rates from the 1995 academic year. Courses the researcher taught during the 1995-96 academic year served as the baseline data (control group) for this study. During 1995-1996, the researcher taught both traditional and telecourse computer applications classes. Four traditionally taught classes (N=81) and two telecourse classes (N=56) formed the control group without review sessions. The control group consisted of the researcher's 1995-96 computer applications students identified through enrollment records. The experimental group consisted of the researcher's computer applications classes introducing review sessions during the Fall Semester 1996. A distance learning survey was conducted to report student reaction to review sessions in telecourse and traditional computer applications courses. In-depth interviews of selected students were conducted from the experimental sample group of students in traditional and telecourse classes.

### Definitions

Terms necessary for a clear understanding of the research conducted include the following definition of terms:

Computer applications course - a course which introduces students to hardware, operating systems, and software



applications including word processing, spreadsheet, and database applications on the computer.

Distance education - a collection of innovative approaches to the delivery of the content of more traditional education.

Formative Evaluation - ongoing feedback to the teacher about how students are doing during the implementation of curriculum (Longstreet & Shane, 1993).

Open broadcast - transmission of voice and video over both public television and cable television stations (Gross, Muscarella, & Pirk1, 1994).

Point-to-point microwave - transmits voice, video, and data between two points in either an analog or a digital format (Gross et. al., 1994).

Radio services - licensed radio stations used to deliver instructional materials (Gross et. al., 1994).

Summative evaluation - final summary of how well students have learned what the objectives have set forth for learning; the culminating activity of the curriculum development process (Longstreet & Shane, 1993).

Telecourse - use of taped media broadcast over public/private television stations delivered as one-way video/audio.

Televised interactive course (TIE) - use of two-way audio/video delivery broadcast from one site and



transmitted to other sites. Sessions are conducted live with tapes made for students absent from class.

Traditional course - live instruction where teacher and students meet together at specified days and times.

Wired communication - transfers voice and video signals over twisted pair wire, coaxial cable, or fiber optics cable (Shelly, Cashman, & Vermaat, 1996).

Wireless transmission - use of cellular phone and computers in a wireless computer environment.

#### Limitations

- The limitations of this study were as follows:
1. Participants in this study were Brevard Community College students enrolled in computer applications courses taught by the researcher.
  2. All participation was voluntary.
  3. This study was limited to the population enrolled in these computer applications classes only. Inferences for a broader population or other delivery methods should be drawn only after consideration of the population and conditions of this study.
  4. Review sessions were conducted by the researcher and videotaped at the Brevard Community College television studio with copies made and sent to the Brevard Community College library locations.



### Assumptions

Assumptions to this study included the following:

1. Participants honestly responded to the questions and self-report items posed in the survey.
2. The survey instrument was both valid and reliable and that the scores obtained were truthful indicators.
3. Taped sessions of live reviews were viewed by students in preparation for tests in televised courses.
4. Students absent from live reviews during traditional classes viewed taped reviews in preparation for tests in the computer applications course.
5. Participants enrolled in telecourse and traditional computer applications courses held as a goal course completion with a grade of "C" or better.
6. Students who participated in this study were representative of students enrolled in the Florida Community College system in computer applications courses.
7. Examinations presented were good indicators of students' performance.



8. Content validity of instructor materials including the test bank and assignments had been established by the authors of the textbook.



## CHAPTER II

### REVIEW OF RELATED LITERATURE

A review of literature directed towards improving achievement and retention in the teaching of computer applications at the college level was conducted. The literature review focused on two major areas: distance education and instructional strategies. Community colleges are facing challenges to meet educational needs of the community of learners. Moriarty (1996) related that community colleges have become a significant educational force in the nation. As technology moves forward, traditional education methods will continue with distance education receiving the focus of much research. To teach content while achieving course objectives, instructional strategies such as review sessions will be implemented to assist student comprehension of material that is presented.

#### Concept of Distance Education

The concept of distance education is certainly not new. Willis (1994) indicated that the world's first distance educators may have been itinerant wanderers who delivered information from afar during their travels. When print was



introduced during the mid-1800s, correspondence courses were offered as a way of reaching those who could not attend a university. Lever (1993) explained how distance education has evolved since the early days of correspondence courses which used the postal system for the delivery of printed course work. The range of correspondence courses that grew out of this movement reached many Americans isolated in rural areas providing them with an access to education that would not have been available otherwise. Willis (1994) stated that in the 1930s, radio offered educational courses with television introduced during the 1950s as a means to offer educational programs.

In 1971, the Open University generated interest in distance education and marked the beginning of a new phase in which degree-giving distance-teaching universities with full degree programs, sophisticated courses, and new media and systematic systems evaluation developed in various parts of the world and conferred prestige on distance education (Holmberg, 1986). The International Council for Correspondence Education changed its name to the International Council for Distance Education in 1982 at its 12th conference (1986). The name change formally recognized significant changes that have been taking place in the delivery of education through distance learning.

Distance education has evolved quietly over the past 25 years, creating little excitement in academia. Hillary



Perraton (1982) summarized achievements of distance education globally by stating that distance education has been taken more seriously in the southern part of the world and has been used for training teachers in a dozen or more countries. She iterated that in the western part of the world distance education has been used mainly to help small minorities of students beyond the reach of ordinary schools and colleges to teach people about political issues, about health, and about the environment. In the eastern part of the world it was used as a way of increasing production of the technicians and technologists.

Distance delivery of traditional education is an attempt by educators to free the learner from the constraints of time and place, and by this improve access for more participants to benefit from an education (Reed and Sork, 1990).

The concept of distance education expanded as new technologies were created and enhanced in the communications arena. Holmberg (1977) indicated that the definition of distance education generally referred to the separation of teacher and student. Moore (1973) addressed communication in his definition by noting that distance education includes communication between the teacher and the learner facilitated by print, electronic, mechanical or other devices. Communication is very important between students and the teacher. At the present time, many institutions



provide telephone, postal, electronic mail, and on-site contact between students and teachers. Feedback between students and teachers is conducted on a regular basis, according to projects, assignments, tests, and other mechanisms for assessment. Students are encouraged to let instructors know if there is a breakdown in instruction. If students need assistance, they are to respond before they fall behind and become frustrated. Communication encourages students to continue with their work and maintains the link established between teacher and student. Sachs (1991) said that strategies for working with distant learners require these students to have a model of set procedures to follow and to produce results that show their thought processes. Two-way communication with feedback is an essential criteria for both teacher and student.

As the boundaries of distance education are not and cannot be clearly and precisely defined, some vagueness must be expected. Garrison (1989, p. 6) provided the following three criteria on which to judge the process of distance education:

1. Distance education implies that the majority of educational communication between (among) teacher and student(s) occurs noncontiguously.
2. Distance education must involve two-way communication between (among) teacher and



student(s) for the purpose of facilitation and supporting the educational process.

3. Distance education use technology to mediate the necessary two-way communication.

#### Current Status of Distance Education

Cotton (1995) analyzed the current state of distance learning activities in higher education by addressing several questions: "How many institutions are either currently engaged or planning to engage in distance learning?" And, "What proportion of the student body is affected?" Cotton (1995) found that 30% of higher education institutions are currently engaged in some form of distance learning; 28% are planning for it during 1994 and 1995, and 42% have no plans. Further, of all institutions in the "currently" and "planning" groups combined, universities lead with 79% either currently engaged or planning to engage in distance learning. Following close behind are the two-year schools with 71%; comprehensive schools at 65%; liberal arts colleges at 45%; and specialized institutions with 37% each currently engaged or planning to engage in distance learning (1995, p. 38).

As the commitment to engage in distance learning represents just one of the dimensions in the overall picture of distance education in higher education, a second dimension is to understand the proportion of the total



student enrollment affected (Cotton, 1995). Fifteen percent of the total enrollment in higher education is affected by distance education with variations reported by category reflecting a low of 7% in universities, 10% in 2-year schools, 15% in comprehensives, 20% in liberal arts colleges, and a high of 36% in specialized schools (Cotton, 1995). Included as comprehensive schools are institutions which award more than half of their baccalaureate degrees in two or more occupational or professional disciplines such as engineering or business administration. Specialized insitituions are considered those which cover a broad array of school types (Cotton, 1995).

Cotton (1995) stated that disciplines most frequently offered through distance education are business, social science, and foreign language. Core curriculum content, and not enrichment activities, are the main thrust of distance learning courses. Further, 58% of higher institutions are involved in distance learning today or plan to be involved in the near future (Cotton, 1995). A high proportion of distance education activity is focused on offering courses for degree programs with the most frequently mentioned disciplines being those associated with the core curriculum.

Project DELTA, an initiative in California (Direct Electronic Learning Teaching Alternative) is attempting to make information technology and distance learning integral parts of the systems instructional program rather than



keeping them as peripheral to it. The goals and framework are to serve as a model for other institutions planning for the twenty-first century. West and Daigle (1993) reported that California's Chancellor Barry Munitz wanted to establish charter campuses using alternative organizational principles to test whether college business may be conducted in a different way from how the institution pays, how it hires, how it teaches, to how it builds. Project DELTA contained three goals: improving instructional quality and effectiveness, increasing student access to higher education by making access more convenient, and promoting greater productivity and accountability in the use of public funds (West & Daigle, p. 32). Results after 14 months indicated that changes in the initial concepts were needed. The project name was changed to Direct Enhancement of Learning Through Technology Assistance and Alternatives to suggest that this was an add-on to traditional methods rather than a replacement or substitute for traditional education. At the outset it was mainly a social and economic initiative, but had been transformed to an infusion of technology into the curriculum to enhance the quality of instruction. DELTA was conceived as a tangible product originally, but increasingly, the process itself has assumed greater significance.

Curriculum models using non-classroom-based delivery methods are essential to successful implementation of



courses. Kearsley and Lynch (1996) indicated that curriculum structure is what distinguishes instruction from informal learning experiences; students can acquire knowledge at the library or by browsing the Internet without any help from a teacher, that is informal learning. The organization of information and learning activities in a formal course should cause it to be a more valuable educational experience (Kearsley & Lynch, 1996). Distance education programs need to strike a good balance between structure and flexibility in their curriculum design and course delivery. Kearsley and Lynch (1996) said that successful distance education programs will tend to have a high level of structure; however, they point out that these conclusions are based upon practical experience, not research studies.

Distance learning complements courses offered by the traditional mode of instruction. Dede (1996) indicated that innovative kinds of pedagogy produced by emerging media, messages, and experiences make possible a transformation of conventional distance education which replicates traditional classroom teaching across barriers of distance and time. Students have opportunities to complete their education with quality instruction, removing barriers that may have hindered them from taking classes to finish a course of study.



Lyons, MacBrayne, and Johnson (1994) stated that in rural, sparsely-populated states such as Maine, development of distance education models serves to meet the needs of the population. Students in rural areas have extremely limited or no access to higher education without substantial travel and expense. Students enrolled in courses statewide accomplished instructional goals with no less effectiveness than traditional courses taught on campus with few students.

Distance learning incorporates technology for the entire community of learners. Doucette (1994) related that technology is used to improve programs and services community colleges provide their students. Colleges are being transformed by information technology, and plans for the future need to be realized as a potential positive outcome for students and schools. The necessity for learning as a lifelong process remains, and with it the need to cope with increased change and the volume of information. Demands for new approaches to learning and educational transactions are being addressed through distance education. Gross, Muscarella, and PirkI (1994) stated that as traditional and distance education have become major topics of discussion in the future of education, most sectors of education recognize that distance learning will be a major element in college mission statements.



## Effects of Technology on Distance Education

The role of distance learning in meeting the educational needs of society in an ever-changing economy has been spurred on by the telecommunications revolution. As we move through the 1990s, Sullivan (1993) pointed out that technology takes clearer shape and the workplace cannot be imagined without computers. An example of computer-supported collaborative learning targeted to enhance the school-to-work transition is the Distant Mentor project at SRI International (Means, Schlager, & Poirier, in Dede 1996). Dede (1996) indicated that literature and classroom field studies conducted on the challenges in transposing skills from school to work confirmed the concept called, "cognitive mentoring," be established to enable workplace experts to mentor students in an apprenticeship-across-distance mode. Further evaluation of this system's effectiveness is in progress (Dede, 1996).

As institutions examine distance education, it is clear that a major challenge is the fear of obsolescence. Sterling (1995) pointed out advances in microchip technology doubles every 18 months, and new technologies will continue to accelerate change in the global economy. Generally, there are four technologies being implemented in distance education: point-to-point microwave, instructional television fixed service (ITFS), radio services, and wireless transmission. Point-to-point microwave



transmission is capable of transmitting voice, video, and data between two points in either analog or digital format with additional contact points added if necessary. There are colleges that use microwave to interconnect campuses such as Brevard Community College in Florida, which uses its microwave system to connect campuses for the purpose of offering classes among all sites. The Federal Communications Commission (FCC) licenses a microwave system to a college and the college purchases the transmitters and equipment necessary to generate the signal (Gross et al., 1994).

Instructional television fixed service (ITFS) has been available for use since the early 1960s and is considered a low cost system that broadcasts a signal in the microwave frequency range (Gross, et al., 1994). Instructional television fixed service (ITFS) is primarily used as a way to send video and audio signals to multiple points without the added expense of the return transmitters required in a duplex microwave application. Gross et al. (1994) pointed out the FCC has licensed educational radio stations to colleges and universities but they have rarely been used to deliver instructional materials. With the increased popularity of cellular phones, many believe that the future will consist of a wireless environment. DeLoughry (1995) stated that wireless transmission could save colleges millions of dollars which would otherwise be spent on wiring



buildings and rooms. DeLoughry (1995) contended that over-air networks are better than the traditional wired versions to meet the needs and habits of students and faculty members.

Generally there are three leased technologies including: open broadcast, wired communication, and satellite transmission. Many colleges and universities currently distribute their telecourses to students off campus using the open broadcast provided through Public Broadcast Service (PBS). Wired communication transfers voice and video signals over twisted pair wire, coaxial cable, or fiber optics cable and is used for telephone lines or to connect personal computers. Experts contend that fiber optics will emerge as the dominant communications medium because of its carrying capacity and low cost (Gross et al., 1994). Satellite transmission, on the other hand, usually requires a large enrollment in a course to make it cost effective. Transmission is sent from a ground-based television station (uplink), received by the satellite, and then transmitted back to the earth station, and received by a satellite dish (downlink). In a typical distance learning course delivered by satellite, the instructor teaches the class in front of a video camera, the course is uplinked to a satellite, and the course is sent to the subscribing school's various satellite dishes (Gross, et. al, 1994).



While new technologies will impact distance learning, current technologies will continue to be used. Whether a college owns or leases the transmission medium, decisions about which delivery method to use should be based on a match of institutional needs, available resources and the capacity of the medium to reach the intended students. A specific transmission medium should not be selected because other schools or colleges are using it, or because it is the fad of the day. Colleges must take into account long-range maintenance and utilization, as well as upfront costs of each technology (Gross, et al, 1994).

Presently schools appear to be using and investigating telecourses, live interactive courses, video teleconferencing, and the internet as a means to distance learning program instruction. According to PBS (1992), from 1982-1992 roughly 60% of the higher education institutions in America offered television courses. Live interactive courses are suited for courses with low enrollments at multiple sites. Gross et al. (1994) stated that programs may be operated in real-time or operated in delayed time. Video teleconferencing has increased from 50 in 1983 to approximately 150 a month in 1994 (Gross, 1995). The major benefit of video teleconferencing is that it brings national experts and resources to the college and the community. Hafner (1995) stated that explosive growth of the Internet has seen major changes in the way computer networks are



being used by colleges in both administrative functions and instruction. Many colleges are offering courses and even complete degree programs over the Internet. Moskowitz (1995) pointed out that University Online is currently contracting with colleges to convert their courses to interactive, on-line courses. Students can access the Internet from a home computer, read and learn the material, use a bulletin board, check the database of frequently-asked questions (FAQs), and communicate with the professor via electronic mail.

#### Distance Education Student Profile

Distance learning studies relating to students enrolled in television courses have been conducted. Moore (1990) described distance learning students typically as employed individuals with more than half having full-time jobs outside their homes; more than half the population are women; and, more than half have family responsibilities; finally, almost all are over 25. These characteristics which once described the "non-traditional" college student, are now characteristics of the "typical" student, many enrolled in on-campus classes as well as television courses (Moore, 1990). Tilson (1993) wrote that over half of all postsecondary enrollments are non-traditional students motivated to develop new skills due to rapid changes in the work place. In a recent consumer survey of distance



learning students, 87% said an important reason for taking a course via distance education instead of traditional education was because it fit better with their work and/or home schedule with one-third of those surveyed having access to Internet and/or Bitnet (Cahill & Charlton, 1995).

#### Research Studies in Distance Education

Studies conducted on distance education have focused on delivery mode effectiveness. Attention has been given to cost effectiveness, satisfaction of students and faculty, and attrition and achievement. Moore and Thompson (1990), in a review of research literature relating to distance education found references to cost effectiveness in several existing distance education programs. Their overall conclusion was that distance education is cost effective as opposed to a traditional delivery system. Moore and Thompson (1990) found there were lower travel expenses, fewer teachers hired per student with higher enrollment that resulted. However, not all distance education programs are considered cost effective. Cuyahoga Community College in Cleveland, Ohio has not found cablecasting cost effective (Shumaker, 1992). Cuyahoga manages a community access television channel with 100 hours of weekly programming through their cable channel (Shumaker, 1992).

Student and faculty satisfaction with distance education programs has been an area receiving attention.



Edmonds (1996) researched desktop videoconferencing in 1994 and found it could be successfully used to improve the quality of interaction between students and teachers and to improve the quality of learning concepts and processes difficult to teach in non-visual distance education. The project involved teachers at the Open Access College (Australia), a family of three primary aged students living on a station in remote South Australia, and two medically disabled students studying primary and secondary subjects in metropolitan Adelaide. Edmonds (1996) reported that the results showed students on the outback station each believed they received better contact with their teachers; the medically disabled students exceeded all expectations for improvement; and the teachers using the equipment felt competent and literate with the technology. Teachers and students involved in the trial said that the "face to face" contact achieved with this equipment along with the increased interactivity generated is what set it apart from other technologies used in distance education.

In a study on future learning by using distance education in community colleges, Parrott (1995) found that one of the greatest challenges facing the widespread implementation of distance education programs rests with faculty who are concerned about the impact of technology on their roles, intellectual property rights, fair



compensation, decline in quality due to canned courses and preserving human contact.

Research on attrition has been the focus of a great deal of research and has received more attention than other aspects of distance learning (Munro, 1988). A survey instrument was designed and administered to a population of currently enrolled and dropout adult students in a post-baccalaureate distance learning program with an individual learner focus (Fjortoft, 1995). The sample consisted of all actively enrolled students (179) and all students who had been admitted to the program since its inception but withdrew before program completion (216), for a total of 395 persons with 50% of the sample (198) who responded to a mailed survey (Fjortoft, 1995). Data from the survey were used to test a predictive model developed to examine the important parameters in adult student persistence in distance learning programs. Findings indicated intrinsic benefits, age, and level of student ease with individual learning were significant factors. Intrinsic benefits related to enhanced performance and satisfaction on the job. Extrinsic benefits, which were described as enhanced salary and career mobility, were not significant factors related to persistence. Adults in this study appeared to be significantly motivated by intrinsic job-related benefits to persist in distance learning programs, with an individual learner focus (Fjortoft, 1995).



Souder (1993) studied the effectiveness of traditional versus satellite delivery in three management of technology master's degree programs. He found in his comparison between traditional classroom and distance learning settings that distance learners performed better than the traditional learners on several dimensions, including levels of maturity, experience, enthusiasm, and sense of responsibility.

Bowles (1988) reported results of a survey of high technology educational delivery systems in nine two-year colleges which emphasized the use of computers to provide alternatives to traditional classroom teaching. There were five in the United States and four in Canada. Increased use and convenience were reported by technology delivery systems implementation.

In grade distribution comparison of students in traditional and corresponding telecourses, Searacy, Gowton and Yarbrough (1993) examined the impact of the delivery system on student achievement where 18 telecourses were matched with an equal number of traditional classes. No significant difference between average grades was found.

However, in a study reported by Andrews and Hall (1991), the success rate which combined achievement variables with completion was significantly higher with traditional delivery methods than in a home study distance education program.



Overall, studies have been conducted in the design and delivery of distance education programs. Also, issues and concerns regarding the implementation and delivery of distance education programs continues to receive attention. Research in distance education programs generally supports effectiveness with respect to cost and student and faculty satisfaction. However, studies examining achievement and successful completion from the same course offered by traditional and distance education methods does not appear in the literature reviews.

### Instructional Strategies

There is an increased awareness among educators that individual learners approach academic tasks with different styles. Various learning styles can mean that some students will be more successful than others in particular situations and with different teachers (Guild & Garger, 1985). Educators desire to see that every aspect of education works toward a common goal for learning (Banathy, 1991). Harmon and Hirumi (1996) said that curriculum, instruction, and assessment focuses on the actual teaching and learning process. A logical, step-by-step approach should be how the components of curriculum, instruction, and assessment are applied to education (Harmon & Hirumi, 1996). The curriculum component is concerned with defining the essential skills, knowledge, and attitudes that students



should have on completion of the program (Harmon & Hirumi, 1996). Schubert (1986) reported that traditionally, curriculum was seen as a commodity created by experts, however, according to Dewey and other progressive educators curriculum should be developed by those who will be affected by it. Thus curriculum essentially is a matter of interaction with content, a process of reflecting, theorizing, and experiencing rather than a reception of subject matter (Schubert, 1986). In order to assist the learners' to apply competencies to real-world situations, Winn (1993) suggested that learning outcomes should describe how learners are expected to apply learned competencies in actual contexts in which they would use them. Learning outcomes may then be used as a core for instructional design and development.

The second educational component is instruction which is viewed as the deliberate arrangement of events to facilitate a learner's obtaining specified objectives (Driscoll, 1994). Schubert (1986) stated that instruction is categorized as an art as well as a science. Research on the issue of whether instruction is an art or science is continually being conducted. In the Handbook of Research on Teaching (Gage, 1963) major breakthroughs were summarized and discussed depicting instruction as a science. Additional research in 1960 and early 1970s focused on the scientific basis of teaching (Gage, 1978). Gilbert Highet



reported in the Art of Teaching (1950) and The Immortal Profession (1976) that the artistry of teaching is built upon knowledge and love of subject, concern for learners, the skill of communication, the value of continuous growth and self-renewal on the part of the teacher. Herb Kohl (1976) described teaching as a craft that might be acquired through apprenticelike involvement rather than by following technological rules from scientific research. Eliot Eisner (1983) described teachers as more like orchestra conductors than technicians needing rules of thumb and educational imagination rather than scientific prescription.

The purpose of instruction is to design, develop, and deliver instructional programs and materials that enable educators to achieve specified curricular objectives (Harmon & Hirumi, 1996). Faculty cannot afford to deliver bad instruction to students, hoping that students will overcome it.

The third educational component is assessment which serves to collect data on student performance (Harmon & Hirumi, 1996). Traditional assessments may include paper and pencil tests which are inclined to evaluate learners capacity to memorize and recall facts, but should focus on students' ability to apply the knowledge and skills defined by the curriculum in valid contexts (Harmon & Hirumi, 1996). These assessments serve as an integral part of learning. Performance assessments are used as an central part of



learning where explicit performance criteria are given to students prior to learning with opportunities for self-assessment, peer assessment, and expert assessment based on those criteria (Harmon & Hirumi, 1996). Feedback and time for reflection are to be provided to the students and to help them become independent learners.

Fortunately there are numerous research-based models of instructional design which can be applied to both traditional and distance education (Bishop, 1976; Dick & Carey, 1990; Gagne & Briggs, 1974; Mager & Pipe, 1978, cited in Harmon & Hirumi, 1996). In Democracy and Education, John Dewey (1916) recommended that the entire school be organized as a miniature democracy. Students participate in the development of the social system and gradually, through experience, learn how to apply the scientific method to improve society (Dewey, 1916).

Herbert Thelen's (1960) models for education include personal inquiry and group investigation with reflective action and skill development. According to Thelen (1960), personal inquiry was to initiate and supervise the processes of giving attention to something whether it be interacting with and being stimulated by other people or through their writing so that reflection and reorganization of concepts and attitudes are shown by conclusions arrived at with new investigations identified for future undertaking. The group investigation model Herbert Thelen used resembled methods



Dewey recommended (Joyce, Weil, & Showers, 1992). The focus of group investigation combines the form and dynamics of the democratic process with the process of academic inquiry in one teaching strategy (Joyce, Weil, & Showers, 1992).

Joyce, Weil and Showers (1992) iterated that Thelen reached for an experience-based learning situation, easily transferable to later life situations which was characterized by vigorous levels of inquiry. Thelen (1960) said that any view of how people should develop referred back to the inescapable fact that life is social, and as such, a social being cannot act without reference to his or her companions on earth. The classroom is comparable to the larger society with a social order and classroom culture and students who care about the way of life that develops (Thelen, 1960). Joyce, Weil, and Showers (1992) said Thelen viewed life in a classroom as a form of a series of inquiries beginning with a stimulus situation to promote student reactions.

Thelen was interviewed by Bruce Weil (1992) and related that significant learning is frequently accompanied by discomfort. Thelen (1960) challenged the effects of comfort and accommodation existing in classrooms so that students would feel comfortable enough to stretch out into the world, but uncomfortable at the same time. The "human quest" is considered a journey that must be taken by everyone (Thelen, 1960). Hunt (1971) wrote that discomfort is a precursor to



growth and stimulates development so that the student moves on toward greater complexity. Research on teacher training has repeatedly uncovered discomfort as teachers obtain new repertoires (Joyce, Weil, & Showers, 1992). As Thelen (1981) indicated, the classroom is a society where teachers lead the classroom group in the construction of educational experience.

In recent years mastery learning has been given attention as an approach for organizing instruction (Joyce, Weil, & Showers, 1992). Mastery learning formulated by John B. Carroll (1971) and Benjamin Bloom (1971) provides a compact, yet interesting means of increasing the likelihood more students will attain satisfactory levels of performance (Joyce, Weil, & Showers, 1992). In 1912, Frederick Burk established the first clear-cut plan for individual instruction and promotion in the elementary school of the San Francisco State Normal School (Washburne & Marland cited in Kulik, 1984). Burk constructed self-instructional materials for units, tested for mastery as pupils completed the work outlined for the unit, and students moved forward on an irregular front subject by subject, according to the number of units satisfactorily completed (Washburne & Marland cited in Kulik, 1984). Burk's student, Carleton Washburne applied and refined Burk's system in the public schools of Winnetka, Illinois (Washburne & Marland, 1963). Kulik (1984) detailed Washburne's application by describing



how students spent half their time in individual work and half their time on group and creative activities; and, during the time devoted to individual instruction, students worked tasks with the help of self-instructional materials. When self-testing showed that a student was ready to progress to the next unit, a test to demonstrate mastery to the teacher was taken (Washburne & Marland cited in Kulik, 1984). Washburne held that no child ever failed, but each child simply took up the next school year where he or she had left off the year before in a subject (Washburne & Marland cited in Kulik, 1984). The practices described, rationale presented, and evaluation used could almost fit into today's journals (Kulik, 1984). Interest in individualized systems of instruction did not occur at this time in history, but instead faded during the great Depression and World War II.

According to Carroll (1971), the degree of learning achieved by any student will be the function of time allowed, the persistence of the student, the quality of instruction, the student's ability to understand instruction, and the student's aptitude. Bloom (1971, pp. 47-63) transformed Carroll's stance into a system containing the following characteristics:

1. Mastery of any subject is defined in terms of sets of major objectives representing the purposes of the course or unit.



2. Substance is divided into a larger set of relatively small learning units, each one accompanied by its own objectives.
3. Learning materials are then identified and the instructional strategy selected.
4. Each unit is accompanied by brief diagnostic tests to measure the student's developing progress (the formative evaluation) and identify problems each student may have.
5. Data obtained from test administration is used to provide supplementary instruction to the student to overcome problems.

Bloom (1971) believed time to learn could be adjusted to fit aptitude with students having lesser aptitude given more time and more feedback while the progress of all is monitored with test assistance.

Bruce Joyce, Marsha Weil, and Beverly Showers (1992) presented overviews of more than 20 models of teaching grouped into four families which have been thoroughly researched and practiced. The four families are (1) information processing, (2) social interaction, (3) personal, and (4) behavioral and represent distinct orientations toward people and how they learn. Schubert (1986) pointed out that educators do not have to select one model or family and use it dogmatically. He suggested that



educators develop a repertoire to draw upon to meet situational needs.

### Computer Instructional Strategies

During the late 1970s and early 1980s with the introduction of microcomputers, schools began using computer technology for instructional purposes (Picciano, 1994). According to data collected in a national survey by Quality Education Data (1991), 98% of all schools had acquired some form of computer technology by 1990 and expected to double their computer equipment expenditures by 1995-96. By examining several national studies (Becker, 1991; Sheingold & Hadley, 1990; U.S. Congress, 1988 cited in Picciano, 1994), instructional uses of computers frequently related to one or more of the following themes:

1. Preparing students for participation in a technically oriented society
2. Enhancing/improving learning by using technological tools
3. Enhancing/improving teaching by using technological tools
4. Providing curricula that is technology-based for students with aptitudes or interests in technology

Being a member of a technically oriented society means that students will need to be prepared to participate in all types of jobs, professions, and everyday routines which use



technology. Students need to be prepared to function in this technological society. Enhancing and improving learning by using technological tools refers to students in the general curricular area who learn to use technology to complete coursework activities by using a computer. Examples include word processing applications for writing papers, spreadsheet applications for completing accounting problems, database applications for filing, or graphics applications for outlines and class presentations. Teachers enhance presentations and teaching activities by using software applications for classroom exercises as well. Providing technology-based curricula for students having an aptitude or interest in technology may lead to vocational programs such as computer information systems and applications or office systems technology which prepare students for employment or advanced education. Technology based instruction and application may serve as a springboard for students exploring academic and vocational pursuits.

Curley and Pyburn (cited in Sullivan, 1993, p. 198) spoke of two types of learning: Type A learning consisting of predetermined set of skills that can be specified a priori and standardized; and Type B, that is ongoing, adaptive learning in which feedback is required because outcomes cannot be specified in advance. Curley and Pyburn (1993) pointed out that learning how to operate the computer is an example of Type A learning. It is a training process



in which proficiency and outcomes are easily measured. Learning how to apply the potential of the technology to a variety of problems solving activities, Sullivan (1993) stressed is a Type B activity. Application of the potential of the technology to a variety of problem-solving activities would be Type B learning, because it is an analytic and conceptual process in the which the learner uses imagination and know-how and builds on experience (Sullivan, 1993). The importance of computer knowledge and use for productivity in school and work is evident.

Business schools began to integrate computer applications into their curricula because of the widespread demands for a computer-literate graduate in industry, and computer and information systems integration is a key prerequisite for American Assembly of Collegiate Schools of Business (AACSB) accreditation (Delone & Biles, 1991). As a result, business schools responded to the challenges of technology. Frand (cited in Delone & Biles, 1991) identified four strategies to follow to introduce microcomputers in the curricula: (1) Saturation Model which supports the development of computer assignments as an integral part of virtually every appropriate course; (2) Selective Model where a small number of faculty are responsible for developing a microcomputer course that provides students with the bulk of their computer exposure; (3) Individual Supportive Model which provides a laissez-



faire approach to computer integration; that is, it provides no organized effort to encourage the use of computers in the curriculum; and (4) Departmental Supportive Model which places the responsibility for integration of MIS (Management Information Systems) into the overall business curriculum in conjunction with academic departments with external support given in the form of hardware and technology consultants.

McEwen (1996) stated that in 1984, the Policies Commission for Business and Economic Education issued a statement which noted that students must be able to use computers for specific business applications including accounting, word processing, data processing, and records management. Further, in 1989, Lutz reported (cited in McEwen, 1996) that the goal for business educators must be technological literacy. Schrag and Poland (1987) pointed out that individualized instruction, demonstrations, lectures, and simulations are possible methods of instruction for microcomputer instruction. Also recommended were activities that actively involve students--lab assignments, small group instruction, lectures, and demonstrations, together with opportunities for learners to practice applications. McEwen (1996) supported this notion with results of a study recently conducted that reflected demonstrations, simulations, and self-paced learning are considered the most effective teaching strategies for computer applications. Malhotra, Tashchian, and Jain (cited



in Raymond & McNabb, 1993) examined various teaching methods and found that the project method is effective in helping students develop communication, problem-solving, critical-thinking, and interpersonal skills. In another study, Nicastro (cited in Raymond & McNabb, 1993) found that both individual and group exercises foster interactive learning. Case analysis also was found to be effective for developing problem solving and managerial skills (Raymond & McNabb, 1993).

Importantly students must have computer skills and abilities desired for educational and employment goals, and it is imperative that students know how to solve problems in order to apply the knowledge and skills they have acquired.

#### Using Review as Part of the Instructional Process

Emphasis on teaching/learning techniques and methodology by educators will enhance students opportunities to be successful in their knowledge. Learning is considered successful when the learner can later recall the stored information with different levels of recall tested by different types of questions. Several techniques may be used to help learners organize the information for permanent storage. Travers (1982) referred to learning material in pieces as chunking. He indicated that most people have a limit of seven "chunks" of material that can be remembered at the same time. Material needs to be organized in some



manner if it is to be effective (Travers, 1982). Vawdrey (1996) indicated the point beyond which comprehensive recall is possible is known as overlearning, and is accepted as the single best way to prevent forgetting. This does not mean the material has to be attended to in the same way over and over; but, it is actually more effective if presented in different contexts (Vawdrey, 1996). An example would be distributed practice over several sessions instead of one long session to enhance retention of information. Research indicates spaced and comprehensive reviews are essential to students' remembering information. According to Palady (cited in Vawdrey, 1996, p. 72), "if 'it' is worth taking time to teach, 'it' must be worth taking time to review."

Day (1992) described review as a tool that will allow teachers to gain insights into the effectiveness of their lessons. Additionally, it may help teachers build up complex cognitive schemata on the teaching/learning process.

King (1992) summarized review strategies in a study with 56 underprepared college students. Self-questioning, summarizing, and review of lecture notes were compared as strategies for learning from lectures. Subjects were randomly assigned conditions with self-questioners performing better than summarizers and significantly better than note-reviewers.

Kardash and Kroeker (1988) indicated that research has shown students who take notes remember more than students



who do not take notes. Further, test performance is enhanced for students who are given an opportunity to review their notes compared to those who have no such opportunity. Kardash and Kroeker (1988) stated that instructors and students have not been offered specific guidelines regarding when review of notes in preparation for an examination is most valuable. They examined the effects of time of review and test expectancy on learning from text. There were 156 undergraduate students who took notes on two texts with the expectation that they would be tested for quantity of information remembered from one text, and for their ability to apply information from a second text. They assigned students to one of five review conditions: after reading; one day prior to the test; immediately before the test; mental review; and no review. Results revealed that the benefits of reviewing notes and optimal placement of the review period partly depended on the test type, i.e., essay, multiple choice. Also, placement of a review period influenced free recall performance, but had no effect on test performance.

In another study, Rickards and McCormick (1988) reported that 77 college students took notes, answered inserted conceptual "pre-questions," or did both while listening to a factual passage. Interspersed questions produced deeper and more elaborate notetaking which



influenced recall. Final results (1988) indicated that open review of notes or questions aided recall.

Lunz (1991) studied the effect of reviewing items and altering responses on the efficiency of computer adaptive tests (CATs) and the resultant ability measures of examinees. There were 712 medical students with 220 subjects randomly assigned to the review condition; 492 were randomly assigned to a review control condition. The test which was designed to establish student ability above or below a pass/fail point, included items from a pool of 726 Rasch calibrated items. Results indicated that the students allowed to review performed significantly, if slightly, better than did control students.

Stone and Lunz (1994) examined the effects of reviewing items and altering responses on examinee ability estimates, test precision, test information, decision confidence, and pass/fail status for 376 examinees taking two certification tests. Results indicated that test precision is only slightly affected by review.

Vispoel (1992) studied the effects of review options on the magnitude, reliability, efficiency, and concurrent validity of scores obtained from three types of computerized vocabulary tests--fixed item, adaptive, and self-adapted. In the study of 97 college students, review modestly enhanced test performance, slightly decreased measurement precision, moderately increased total testing time, affected



concurrent validity, and was strongly favored by examinees. Vispoel (1992) related that computerized tests do not necessarily yield equivalent results, and thus may have to be equated to confirm fair use of test scores. Differences in performance favoring paper-and-pencil tests in some prior studies occurred because review options were excluded from the computerized tests.

O'Donnell and Dansereau (1993) studied the effects of cooperative and individual review of lecture material on subsequent free recall performance with 109 undergraduate students in four experimental conditions. Results reported (1993) suggested that cooperative review can be effective even though the group did not significantly outperform the individual review group.

### Summary

Studies cited in this chapter were conducted in traditional classes or laboratory settings. Most of the research focused on higher education. Distance education presents instructional challenges because the student is generally removed from the traditional classroom setting. The research on the effects of review on student success revealed students appeared to do better with review sessions than without review sessions.



### CHAPTER III

#### METHODS AND PROCEDURES

##### Design

A quasi-experimental design was used to measure the effects of review sessions on student achievement and retention in computer application classes. Intact classes were used to form the 4 groups used in this study. Randomization was limited to choices students made in registering for the classes. The control groups for this study consisted of those students enrolled in computer application classes during Fall 1995 and Spring 1996 semesters. The experimental groups were formed by those students enrolled in the computer applications classes during Fall 1996 (see Appendix A for syllabus sample).

Review sessions were conducted during scheduled class meetings with traditional classes in the experimental group during the Fall 1996 semester. Video tapes of live reviews were made available to telecourse students. Printed outlines of topics were distributed to the traditional classes and mailed to the telecourse students (see Appendix B for outline sample). The mailing was sent to students as soon as reviews were conducted.



The researcher obtained demographic data and final course grades through the Student Information System (SIS) of Brevard Community College. Student information was collected on the college application form filled out by the student prior to enrollment in the college for the first time. Withdrawals were recorded from withdrawal forms manually filled out by students or instructor. Final course grades were recorded from course grade sheets manually filled out by the researcher.

### Setting

Brevard Community College is the institution at which this study was conducted. A comprehensive, public two-year community college established in 1960, the college has four campus locations and two centers, enrolling over 23,000 credit students (unduplicated count) and 53,000 non-credit students (duplicated count) annually (Brevard Community College, 1995). Brevard County is a long, narrow county approximately 56 miles from the northern border to the southern tip of the county. The Titusville Campus is at the northern end of the county with the Cocoa Campus located approximately at the middle of the county as the district headquarters. The Melbourne Campus is to the south of the Cocoa Campus, and the Palm Bay Campus is at the southern end of the county. Kennedy Space Center and Patrick Air Force Base are center locations serving members of the space



industry and military service. Brevard Community College is ranked among the top 25 institutions in the United States for total number of associate degrees awarded annually (Brevard Community College, 1994). The college grants Postsecondary Adult Vocational Certificates, Associate in Science degrees, and Associate in Arts degrees.

Brevard County has a population over 400,000 and is dominated by an industrial base consisting of aerospace, high tech commercial, and defense firms (Brevard Community College, 1994). Companies have from one to three shifts working round the clock making traditional educational delivery systems difficult for some potential students to access.

Computer applications is a course offered for college credit that will apply towards a one-year Certificate, an Associate in Science degree, or Associate in Arts degree. Computer applications is a required course in many programs of study in the Associate in Science degree programs and used as elective credit in the Associate in Arts degree programs. Many certificate programs require computer applications as well, and the course is open to individuals in the community who wish to explore computer usage for personal or professional purposes. The catalog course description for CGS 1530 describes the course as an introductory course in the application of commercially available software for microcomputers -- topics include:



word processing, electronic spreadsheets, data base management, computer graphics and key pad.

Students enroll in traditional and telecourse methods of delivery in order to obtain information on computer software applications. The topics taught in this course form the foundations on which other concepts and software applications are based.

### Participants

Participants used in this study were community college students enrolled in the researcher's Microcomputer Applications Processing course offered through traditional and telecourse instruction. The control groups consisted of the researcher's students enrolled in the computer applications classes during the Fall and Spring 1995-96 academic year. The researcher taught a total of four traditional classes and two telecourses during the 1995-96 Fall and Spring Semesters. Enrollment figures reflect that there were a total of 81 students enrolled in the traditional classes (Control Group I) and 56 enrolled in the telecourse offerings (Control Group II) for a total of 137 control group students. These students received no review sessions as part of their instruction.

The experimental group consisted of the researcher's students enrolled in the Microcomputer Applications Processing course offered through traditional and telecourse



instruction during the Fall Term, 1996. During the Fall Term, 1996, there were three traditional classes and one telecourse class taught by the researcher. Sixty-seven students were enrolled in the traditional classes (Experimental Group I) and thirty-five were enrolled in the telecourse (Experimental Group II) for a total of 102 experimental group students. Both of these groups received systematic review sessions as part of their instruction. Student completion rates from both the control and experimental groups were compared to determine the effect review sessions had on retention. In addition, student scores (grades) achieved in both groups were compared to determine the effect review sessions had on academic achievement.

#### Control Group

Brevard Community College course offerings are based on the semester system. Traditional courses used in this study met a total of 48 contact hours during the semester for instruction and testing. A two-hour final exam was added at the end of the 16 weeks of instruction. Class meetings were scheduled as three 50-minute sessions (Monday, Wednesday, and Friday), or two 75-minute sessions (Tuesday and Thursday) during the 16-week semester. Telecourse classes met a total of four times: once for orientation and three times for testing during the 16-week semester. The



instructional system implemented with the control group consisted of lectures and demonstrations with hands-on applications during class sessions for traditional students. Telecourse students watched taped lectures and hands-on demonstrations by the researcher.

Formative evaluations consisted of textbook assignments in word processing, spreadsheet, and database applications. Points were accumulated and counted approximately 50% of the total course grade. Summative evaluations created from test bank items that accompany the textbook materials reflected approximately 50% of the total grade for the course. There were five exams in the traditional class and three exams in the telecourse computer applications course. Content of material being tested for both the traditional and telecourse students was the same. Student grades were assigned according to percentages achieved.

#### Experimental Group

Students enrolled in the Fall Semester, 1996, traditional and telecourse computer applications course with the researcher at Brevard Community College were selected as the experimental group. Traditional courses met a total of 48 contact hours during the semester for instruction and testing. A two-hour final exam was given according to the final exam schedule at the end of the 16 weeks. Class meetings were scheduled as three 50-minute sessions (Monday,



Wednesday, and Friday), two 75-minute sessions (Tuesday and Thursday), or one 2.5 hour session (Monday) during the 16-week semester. Telecourse classes met a total of four times: once for orientation and three times for testing during the 16-week semester. Live review sessions were conducted by the researcher during the traditional classes at the conclusion of each unit of study for a total of five reviews. Reviews were taped and made available to the students enrolled in the telecourse class. No attempts were made to check on student viewing of the review tapes.

Review sessions were designed to review concepts, reinforce knowledge of subject matter, and focus on areas needing further study or remediation based on verbal responses given by students as well as results of completed homework activities.

Evaluations were administered to both traditional and telecourse computer applications students in the experimental groups. There were a total of five evaluations in the traditional computer applications course and three evaluations in the telecourse computer applications course. Questions for the summative evaluations were selected from the Test Bank questions accompanying the text Shelly Cashman Series, Custom Edition, which was used during this project. Tests were designed to be completed within 60 minutes with flexibility built into the testing time for students needing or requiring additional time.



In addition, a questionnaire was distributed to students in the treatment (experimental) group to provide information regarding student reaction to the computer applications course and reviews. Attitudes and perceptions of course experiences between traditional and telecourse students in experimental groups were compared. Also, there were in-depth interviews of selected participants from the experimental group. Data collected provided information which gave insight as to why review sessions worked or did not work. Responses to the questionnaire were anonymous with no attempts made to document who completed the questionnaires from the experimental group.

### Instruments

Summative evaluations were conducted with traditional and telecourse computer applications classes during the experiment. The test bank accompanying the textbook provided true-false and multiple choice questions. Validity of content was assumed as inherent in the test bank for use with the textbook. Test bank questions were selected for the construction of tests in the following areas: computer hardware, DOS/WINDOWS, word processing, spreadsheet, and database. Test responses were graded for accuracy and comprised approximately 50% of the final score of each student. Formative evaluations included homework applications developed by the authors of the textbook were



marked for accuracy and comprised the remaining 50% of the final score of each student. Instructor manual guidelines were used to determine correctness with points assigned and converted to percentages as indicated by criteria consistent with the textbook. Both the control groups submitted homework from textbook activities. Test bank items for summative evaluations and homework assignments were consistent with the experimental group.

Control group information was obtained through enrollment records of the researcher with respect to withdrawal and grades for both traditional and telecourse computer applications courses.

Instruments used in this study included a survey administered to the experimental group, and in-depth interviews with selected participants from the traditional and telecourse computer applications experimental group. The survey was used to obtain reactions to review sessions and perceptions of the course. Open-ended questions were administered to selected participants of the experimental group during in depth interview sessions for expanded information on review sessions and course perceptions.

The survey used in this study was an adaptation of one designed by Beed, Gianchetta, and Withycombe (1992) to measure student attitudes regarding instructional television (Appendix C).



### Validity and Reliability

Since the same test bank was used in the construction of tests used in both the control and experimental groups, and since no attempt was made to influence students' registration for classes, it was assumed by the researcher that internal and external validity threats were kept to a minimum.

### Data Collection

Survey and summative evaluation instruments used were administered to students during class meetings. Students absent from scheduled class meetings had survey and summative evaluation instruments administered at appointed times scheduled by the student and teacher during the experiment. Summative evaluations for the traditional and telecourse students measured cognitive development of the students in the field of computer applications assisting in the comparison of the two instructional delivery systems.

Student reactions to review sessions and perceptions to the course were evaluated by the survey distributed at the end of the semester. Surveys were administered on an anonymous basis to all students in the experimental group. In-depth interviews were conducted with selected participants from the traditional and telecourse experimental group for an expanded view of review sessions and perceptions of the course.



Demographic information gathered from the control group and the experimental group included gender, age, and grades achieved. Information gathered was used to compare the two populations; control group of traditional and telecourse classes and experimental group of traditional and telecourse classes.

Data collection of the control group permitted a comparison of student grades in traditional computer applications with that of student grades in telecourse computer applications. Within the data collection, there was also a comparison of student retention rates in the control group of traditional computer applications course with that of the telecourse computer applications course.

Experimental group data collection included the treatment of live review sessions. Student grades in the experimental group permitted grades to be compared from the experimental group in traditional computer applications group and the telecourse computer applications group. Comparisons of grades between the control group and the experimental group were done to determine if grades improved after the treatment.

Data collection of retention status from the control group and the experimental group of both traditional and telecourse computer applications were then made and compared to assess whether retention increased after the treatment.



Student reactions were collected and provided insight as to the reactions of the review sessions and perceptions of the course.

### Data Analysis

A 2 X 2 ANOVA was used to analyze the data. There were two independent variables, (traditional and telecourse) with two levels, control (non-review) and experimental (review) groups. The overall F tests are sufficient to determine group differences without resorting to different multiple comparison procedures.

Data were analyzed to determine if improvement in student achievement and retention in both the traditional and televised computer applications courses was effected by review sessions.



## CHAPTER IV

### DATA ANALYSIS

The purpose of this study was to explore the effects of review sessions on student achievement and retention in a computer applications course taught by televised distance learning and traditional instruction. A total of 239 students were enrolled in this study. There were 137 students in the control group (no review sessions) who were enrolled in traditional and telecourse computer applications during the Fall Term 1995 and Spring Term 1996. There were 102 students in the experimental group (with review sessions) who were enrolled in traditional and telecourse computer applications during the Fall Term 1996.

Data used in this study were obtained from four major sources. One source of data was the Student Information System (SIS) at Brevard Community College. Data collected from this source provided collegewide information pertaining to achievement and retention.

The second source of information was the researcher's grade book which contained information reported to collegewide data services. Data from this source included results from both control and experimental groups.



The third source of information was generated from responses by the experimental group to a questionnaire. Administration of the survey to 102 students was conducted at the end of the Fall 1996 Semester. Sixteen students in the telecourse class and 49 students in the traditional classes returned questionnaires, all valid and usable.

The fourth source of information was obtained from interviews with selected students enrolled in the researcher's classes. Three students were interviewed from the traditional class and three students from the distance education class. Results complemented information from survey responses addressed in research question five.

#### Demographic Information

Demographic data on the experimental group included age level of the participants, gender, and employment information with categorized frequencies and percents calculated for each category. These data were determined by the researcher to have potential impact on who enrolled in traditional and telecourse classes. Data were collected from the experimental group through the questionnaire administered to the group during the Fall 1996 term and are presented in Table 5. It was assumed by the researcher that the demographics on this group would have been reflective of the demographics for the control group, i.e., those students



previously enrolled in the traditional and telecourse classes during 1995-1996 academic year.

TABLE 5  
DEMOGRAPHIC DATA: EXPERIMENTAL GROUP

METHOD	NUMBER DISTRIBUTED	RESPONSES RECEIVED	PERCENT RECEIVED
Traditional	67	49	73.1%
Telecourse	35	16	45.7%
Total	102	65	63.8%
Gender		Freq	Percentage
Female		42	64.6%
Male		23	35.4%
Age		Freq	Percentage
17-24		41	63.1%
25-45		20	30.7%
46-65		4	6.2%
66 & over		0	---
Employment		Freq	Percentage
Full-time		25	38.5%
Part-time		28	43.1%
Self-employed		0	---
Not employed		11	16.9%
No Response		1	1.5%



Seventy-three percent of the students enrolled in the traditional class completed the survey while only 46% of the telecourse students completed the survey for an overall 64% questionnaire return. Gender response reflected 65% female responses, and 35% male responses. In the age group category, the majority (63%) were 17-24 years of age with 31% in the 25-45 age group and 6% in the 46-65 group. There were no returns for the 66 and over group. Employment information disclosed over 80% of the students were employed part-time or full-time.

#### General Information

Historical data from Brevard Community College were obtained for collegewide traditional and telecourse enrollments in computer general studies courses for comparative purposes. As was reported in Chapter I, the completion rates and withdrawal figures for collegewide computer general studies courses were consistent with other collegewide course offerings (see Tables 1-3). Grade distribution for collegewide computer general studies courses for the terms of the study are presented in Table 6, and Table 7 summarizes the grade distribution for the experimental and control groups used in this study.



TABLE 6  
CGS 1530 AND CGS 1000  
COLLEGEWIDE TELECOURSE AND TRADITIONAL  
GRADE DISTRIBUTION

METHOD		ACHIEVEMENT					
	A	B	C	D	F	I	W
Fall 1995							
Traditional	44.1%	24.8%	9.6%	2.4%	9.8%	--	9.0%
Telecourse	43.8%	8.2%	12.3%	--	11.0%	2.7%	21.9%
Spring 1996							
Traditional	52.4%	16.7%	5.9%	2.8%	12.0%	--	9.5%
Telecourse	46.7%	8.3%	5.0%	--	15.0%	1.7%	23.3%
Fall 1996							
Traditional	46.0%	21.3%	7.3%	2.4%	11.4%	1.5%	8.3%
Telecourse	37.9%	18.2%	9.1%	3.0%	6.1%	7.6%	15.2%

As reported in Table 6, grades from collegewide computer general studies revealed nearly 50% of the grades in both traditional and telecourse classes were As. The percentage of B grades in traditional classes, although lower than A grades is higher in the traditional classes than in the telecourse classes, particularly in the 1995-96 academic year. Grades reported for "C" and "D" were in the 5% to 12% range for both traditional and telecourse groups. Failures, "Fs", were reported from 8% to 15% for both groups. Withdrawals ranged from 6% to 23% with telecourse students having higher withdrawal percentages.



Subsequent to confirmation of collegewide information, data collected from the researcher's control and experimental groups were processed through the college's Student Information Systems (SIS) and results are reported in Table 7.

TABLE 7  
CGS 1530  
CONTROL AND EXPERIMENT  
TRADITIONAL AND TELECOURSE  
GRADE DISTRIBUTION

METHOD	ACHIEVEMENT						
	A	B	C	D	F	I	W
CONTROL							
Traditional	16.0%	30.4%	12.0%	6.0%	16.9%	--	18.9%
Telecourse	10.9%	15.1%	17.5%	--	22.0%	4.9%	29.7%
EXPERIMENT							
Traditional	22.4%	29.9%	14.9%	6.0%	11.9%	--	13.4%
Telecourse	13.9%	25.0%	16.7%	5.6%	11.1%	--	27.8%

Researcher's grade reports were lower than the collegewide grades for both traditional and telecourse classes in the "A" through "C" categories. Categories that reflected similarities to collegewide computer general studies grades were with the "D" and "I" grades. These two categories had the lowest percentages both in the researcher's courses and in collegewide computer general studies courses.



Withdrawals in the researcher's classes were generally higher than in the collegewide classes and the withdrawals in the telecourses were higher than in the traditional classes, a pattern reflective of collegewide computer classes.

### Research Question One

The first research question addressed was, "How do student grades in televised computer applications courses compare with student grades in traditional computer courses?"

In order to answer this question, the researcher examined student grades recorded for the control and experimental groups. The percentage of A grades in both the control and experimental groups was higher for traditionally taught classes than telecourse classes. This was also true for percentage of B grades; however, in the control group (classes with no review options), the percentage of B grades in traditionally taught classes was double for that of the telecourses. There was no appreciable difference in percentages of C grades. In the control group a larger percentage of students received F grades in telecourse classes than traditionally taught classes; however, in the experimental group these percentages were the same (see Table 7).



## Research Question Two

The second research question, "How does student withdrawal in televised computer applications courses compare with student withdrawal in traditional computer courses?"

This question was addressed first by revealing collegewide computer general studies course withdrawal figures in Table 8, followed by the researcher's withdrawal figures shown in Table 9.

TABLE 8

CGS 1530 AND CGS 1000  
COLLEGEWIDE TELECOURSE AND TRADITIONAL  
WITHDRAWALS

TERM	TRADITIONAL	TELECOURSE
Fall, 1995	8.96%	21.92%
Spring, 1996	9.52%	23.33%
Fall, 1996	8.34%	15.15%

Collegewide computer telecourse withdrawal percentages are shown with approximately twice the number as traditional courses percentages.

The control and experiment group withdrawals for computer applications are summarized in Table 9.



TABLE 9

CGS 1530 CONTROL AND EXPERIMENT  
TELECOURSE AND TRADITIONAL  
WITHDRAWALS

TERM	TRADITIONAL	TELECOURSE
Fall, 1995 (Control)	13.95%	31.43%
Spring, 1996 (Control)	23.68%	28.00%
Fall, 1996 (Experiment)	13.43%	27.78%

Higher percentages of withdrawals are reflected in the researcher's groups when compared to collegewide withdrawal percentages. However, traditional and telecourse withdrawal percentages followed the collegewide trend. Withdrawals are higher among telecourse students than traditional students.

Research Question Three

The third research question addressed, "Would student grades in telecourse and traditional courses improve with the addition of review sessions?"

The 2 X 2 Factorial ANOVA was used to determine the effect of review on performance of students in traditional and telecourse classes as measured by achievement and presented in Table 10.



TABLE 10

TWO WAY ANALYSIS OF VARIANCE  
REVIEW AND METHOD BY GRADE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	PROB.
Main Effects					
Review (A)	1	7.388	7.388	3.780	.053
Method (B)	1	4.617	4.617	2.362	.126
Interaction (A*B)	1	.981	.981	.502	.480
Model	3	13.611	4.537	2.321	.077
Residual	184	359.639	1.955		
Total	187	373.250	1.996		

The ANOVA indicated that review sessions made a difference. A t-test was used to test for specific mean differences between the two group means. The t-test indicated significance at the .06 level as shown in Table 11.

TABLE 11

T-TEST FOR EQUALITY OF MEANS  
REVIEW AND METHOD OF INSTRUCTION

GROUP	N	MEAN	SD	SE
No Review	105	2.07	1.45	.142
Review	83	2.46	1.32	.145

df=186; t=1.911; p < .06



Those students who had review ( $\bar{x} = 2.46$ ) did better than those students who did not have review ( $\bar{x} = 2.07$ ).

#### Research Question Four

The fourth research question, "Would student retention in computer applications telecourse and traditional courses improve with the addition of review sessions?"

Retention was defined as students receiving grades A, B, and C, because the community college generally perceives D grades as non-satisfactory in most programs. In the control group a 58.4% retention figure was reported for the traditional classes with 43.5% in the telecourse class. Experimental group figures were 67.2% retention for the traditional classes and 55.6% for the telecourse class. Thus, student retention improved with the addition of review sessions in both traditional and telecourse classes.

#### Research Question Five

The fifth and final question, "What are student reactions to review sessions?" was obtained from questionnaire responses and reflected in Tables 12 through 15.



TABLE 12

CGS 1530 - TRADITIONAL CLASSES  
STUDENT REACTIONS TO COMPUTER APPLICATIONS COURSE  
AND REVIEW SESSIONS

QUESTIONS	FREQ	PERCENT
<hr/>		
Your Perception of this course		
1. Fantastic	8	16.3%
2. Helpful	33	67.3%
3. Uncertain	4	8.2%
4. Not Helpful	1	2.0%
5. Boring	2	4.1%
6. No response	1	2.0%
<hr/>		
Your Perception of the teacher		
1. Fantastic	20	40.8%
2. Helpful	20	40.8%
3. Uncertain	2	4.1%
4. Not Helpful	1	2.0%
5. Boring	3	6.1%
6. No response	3	6.1%
<hr/>		
Your attitude about this class via television		
1. Fantastic	0	12.3%
2. Helpful	0	3.1%
3. Uncertain	31	53.8%
4. Not Helpful	5	26.2%
5. Boring	4	4.6%
6. No response	9	---
<hr/>		
Your attitude about this class via traditional method		
1. Fantastic	9	18.4%
2. Helpful	27	55.1%
3. Uncertain	8	16.3%
4. Not Helpful	1	2.0%
5. Boring	3	6.1%
6. No Response	1	2.0%
<hr/>		
Your reaction to review sessions		
1. Fantastic	5	10.2%
2. Helpful	23	46.9%
3. Uncertain	4	8.2%
4. Not Helpful	7	14.3%
5. Boring	7	14.3%
6. No response	3	6.1%
<hr/>		



TABLE 13

CGS 1530 - TRADITIONAL CLASSES  
STUDENT ESTIMATE OF AVERAGE  
STUDY HOURS PER WEEK AND PREFERENCES

HOURS	RESPONSE	PERCENTAGE
0-3	21	42.9%
4-6	19	38.8%
7-9	2	4.1%
10 and over	4	8.2%
No response	3	6.1%

  

Study Preference		
1. Computer Lab	23	46.9%
2. Your Own Computer	9	18.4%
3. Combination Lab and Your Own Computer	17	34.7%
4. No Response	0	---



TABLE 14

CGS 1530 - TELECOURSE CLASS  
STUDENT REACTIONS TO COMPUTER APPLICATIONS COURSE  
AND REVIEW SESSIONS

QUESTIONS	FREQ	PERCENT
<hr/>		
Your Perception of this course		
1. Fantastic	7	43.8%
2. Helpful	9	56.3%
3. Uncertain	0	---
4. Not Helpful	0	---
5. Boring	0	---
6. No response	0	---
<hr/>		
Your Perception of the teacher		
1. Fantastic	15	93.8%
2. Helpful	1	6.3%
3. Uncertain	0	---
4. Not Helpful	0	---
5. Boring	0	---
6. No response	0	---
<hr/>		
Your attitude about this class via television		
1. Fantastic	8	50.0%
2. Helpful	2	12.5%
3. Uncertain	5	31.3%
4. Not Helpful	1	6.3%
5. Boring	0	---
6. No response	0	---
<hr/>		
Your attitude about this class via traditional method		
1. Fantastic	5	31.3%
2. Helpful	7	43.8%
3. Uncertain	2	12.5%
4. Not Helpful	0	---
5. Boring	0	---
6. No Response	2	12.5%
<hr/>		
Your reaction to review sessions		
1. Fantastic	7	43.8%
2. Helpful	7	43.8%
3. Uncertain	1	6.3%
4. Not Helpful	0	---
5. Boring	0	---
6. No response	1	6.3%
<hr/>		



TABLE 15

CGS 1530 - TELECOURSE CLASS  
STUDENT ESTIMATE OF AVERAGE  
STUDY HOURS PER WEEK AND PREFERENCES

HOURS	RESPONSE	PERCENTAGE
0-3	1	6.3%
4-6	13	81.3%
7-9	0	---
10 and over	2	12.5%
No response	0	---

  

Study Preference		
1. Computer Lab	3	18.8%
2. Your Own Computer	9	56.3%
3. Combination Lab and Your Own Computer	4	25.0%
4. No Response	0	---

Student responses to the questionnaire were revealing. A majority of the students in the traditionally taught classes, (84%), rated the computer applications class as helpful or fantastic. Telecourse student perception of the computer applications course was rated helpful or fantastic by all (100%) respondents of the survey. A similar finding was reported by the traditional and telecourse students with regard to the teacher, (80%), as helpful or fantastic ratings from traditional class responses, (100%), from telecourse respondents. There was a high favorable rating received from telecourse respondents concerning their attitude about this class offered via television (62%).



Traditionally taught students responded with a high rate of uncertainty, (53%), about the course offered via television. Response to student attitude about computer applications offered via traditional method received a majority response from traditionally taught students, (73%), who indicated the course was helpful or fantastic. Interestingly, telecourse students' attitudes about this class via traditional method was high as well (74%). There were more favorable attitudes about the traditional method being preferred over the televised method of instruction from respondents of the questionnaire.

Reactions to review sessions was helpful to fantastic by 57% of traditionally taught students. There was an 87% telecourse student respondent rating of helpful to fantastic. Interestingly, 42% from traditionally taught classes rated reviews as uncertain, not helpful, boring, or gave no response. However, only 12% of the telecourse respondents rated reviews as uncertain or gave no response. Evidence suggested students found review sessions useful.

A majority of student responses in the traditionally taught (81%), and telecourse group (87%), reported up to six hours per week of estimated study time. Findings suggested that method of course instruction had little impact on the amount of time students devoted to studying.

Study preferences for traditionally taught students revealed a majority of students, (80%), used the lab or a



combination of the lab and their own computer. Telecourse student respondents also reflected a majority of students, (81%), used their own computer or a combination of the lab facilities and their own computer. Clearly, students use the lab, but they also use computers elsewhere to complete activities.

### Interviews

Interviews were conducted with selected students from both traditional and telecourse classes with results presented in Table 16.



TABLE 16  
INTERVIEW RESPONSES FROM  
SIX SELECTED STUDENTS

CATEGORIES	TRADITIONAL	TELECOURSE
<u>Age Group</u>		
17-24	2	1
25-45	1	2
<u>Gender</u>		
Male	1	1
Female	2	2
<u>Race</u>		
White (Non-Hispanic)	1	2
Black (Non-Hispanic)	1	1
Hispanic	1	0
CATEGORY	FREQ	PERCENT
Computer applications course Required AS/AA, BS/BA program	6	100%
Course preference-method		
Fit school/work schedule	4	67%
Needs traditional	2	33%
Review session attitude		
Helpful	6	100%
Estimated overall GPA		
4.0	1	17%
3.0	3	50%
2.0	2	33%
Present estimated course grade		
A	2	33%
B	3	50%
C	1	17%
Course withdrawal history		
Yes	3	50%
No	3	50%



Interviews with the six selected students yielded interesting insights into responses regarding student attitudes and perceptions about the course. Students interviewed were open to responding in a candid manner. They responded to specific questions posed with ease, and they were willing to amplify ideas and opinions they held regarding the course. Student responses were tape recorded by the researcher, with permission of the students, for accuracy in reporting responses and comments. Interviews lasted approximately thirty minutes with each student.

Students unanimously (100%) stressed a need to know how to use computers. In addition, all reported the course was required for their program of study either at the community college or at the university level.

When it came to the method of instruction for taking computer applications, students reported that enrollment revolved around the course, school schedule and employment schedule rather than method of delivery. One telecourse student indicated that she had no choice due to her full-time work schedule and family responsibilities. A male student indicated that he was in the military, and he wanted the flexibility a telecourse offered due to the nature of various military assignments. The other female telecourse student wanted to try a telecourse to see if she liked this method of instruction. She concluded that this would be her last telecourse, if at all possible, as she did not like



this method of instruction. The male traditional student was retired military, and he felt strongly that this course should be taken in a traditional manner. He felt that there should be a class of students in the same room with teacher interaction and discussion along with demonstrations to promote collaborative learning. He indicated to the researcher that he was from the traditional school of learning, and he was in the forty plus age group. Two female traditional students could not imagine trying to complete computer applications without a teacher, and they were in the 17-24 age group. Regardless of age, individual students held their own opinions on the desired method of instruction to meet their needs. Telecourse options were appealing to those who had time restrictions and perhaps were more adventurous, while traditional courses implied a "safe" environment to those who could accommodate the schedule of classes.

When the interviewed students were asked about their estimated overall GPA, they were reluctant to reply at first. However, they speculated on their GPA with the male traditional student at 4.0; the male telecourse student at 3.0; one female traditional student and one female telecourse student at 3.0; and one traditional and one telecourse student at 2.0. Student estimates indicated that they saw their GPAs in the "A" to "C" grade category. All students interviewed indicated that their overall GPA was



important to them. They felt it was necessary to maintain a high GPA for employer reimbursement, financial assistance, or future educational opportunities.

All students indicated they were striving to achieve an "A", "B", or "C" in computer applications. Interviews were conducted during the 10th through the 14th week of the course, and these students had completed approximately 75% of the course at the time of the interview. Students interviewed were able to calculate their current grades based on test and homework averages. The male traditional student felt he had an "A" at this point, and he felt that he would be able to maintain his current standing. Of the two female traditional students, one felt she had a "B" at the present time, and the other female student felt she had a "C" at the present time. The student who indicated "C" felt insecure about her grade, and she pointed out that she usually did not earn grades that were lower than a "B". The male telecourse student felt he had an "A" with the other two female telecourse students indicating they thought their grade was "B". All telecourses students felt pleased with their current estimated grade for the computer applications course.

Finally, students interviewed were asked if they had ever withdrawn from a college course. Three students volunteered that they had withdrawn from one course during their college career and, three students had never withdrawn



from a college course. Students who had withdrawn said they did so to maintain their GPA, and they did not want to receive a low grade or possibly failing grade from a course.

Interview inquiries expanded on questionnaire responses from the experimental group. Interview responses were open with constructive student remarks. A willingness to be a participant in this research study was evident in their approach to answering questions in a thorough manner.



## CHAPTER V

### DISCUSSION AND RECOMMENDATIONS

#### Summary and Discussion

Solving today's educational challenges includes maintaining access, improving achievement, and increasing retention. Callan (1995) stated that major changes will be required in the organization and delivery of higher education, especially changes that will have the effect of extending the instructional reach of faculty and institutions, moving to alternative learning paradigms, and increased use of technology while maintaining quality instruction. Phelan (1997) indicated that community colleges need to evaluate methods which include distance education delivery which assists colleges and serves students.

Distance education and traditional instruction have been studied with achievement and retention figures examined. The expectation of lower completion rates of distant learners has been reported in studies (Cheng, Lehman, and Armstrong, 1991) and on rates recorded through the SIS (Student Information Systems) at Brevard Community College (Brevard Community College, 1995). Dempster (1991)



reported on review sessions in a synthesis of research that stated reviews improve classroom learning and retention. However, there has not been research-based evidence supporting the impact of reviews on the same course taught via traditional and distance education.

In this study, the effects of review sessions on student achievement and retention in a computer applications course taught by televised distance learning and traditional instruction were compared. Student achievement in traditional and telecourse classes was compared and student responses were studied to determine the impact of the method of instruction and reviews sessions.

There were 137 students in the control group who had enrolled in the traditional and telecourse computer applications during the Fall Term 1995 and Spring Term 1996. There were 102 students in the experimental group who were enrolled in traditional and telecourse computer applications during the Fall Term 1996 with review sessions. Data for the study were collected through the SIS system at Brevard Community College and from the researcher's grade book. A questionnaire was adapted from one designed by Beed, Gianchetta, and Withycombe (1992) to measure student attitudes regarding instructional television. The survey was administered to 102 students at the end of the Fall 1996 semester. Responses were received from 16 students in the



telecourse class and 49 students in the traditional classes with all returned questionnaires valid and usable.

Data analyses revealed statistically significant differences between control (non-review) and experimental (review) groups in terms of the review on grades (see Table 10). Moreover, data analyses disclosed that the review group achieved a higher mean grade than the group not reviewed. A t-test used to test for specific mean differences between the two group means indicated significance at the .06 level (see Table 11) reported with a mean of 2.07 for non-review students and 2.46 for those students who reviewed. This confirmed the fact that those students who had review sessions did better than those students who did not have review regardless of method of delivery.

Although true random assignment of students to the traditional and telecourse groups was not possible, the researcher felt student enrollment based upon availability of courses was sufficiently random to warrant the 2 X 2 ANOVA comparison.

#### Research Question One

How do student grades in televised computer applications courses compare with student grades in traditional computer courses?



There were fewer As in the control group than in the experimental group regardless of method of delivery. There were fewer As and Bs in both control and experimental telecourses than traditional courses. Perhaps those students receiving As in the control group are high achievers and would receive a high grade regardless of the method of delivery. With a smaller overall student population in telecourse classes, it may be more A and B students prefer traditional courses. Traditionally taught students receive verbal cues which reinforce concepts learned, and this may contribute to higher achievement.

There were more Cs and withdrawals in the telecourses than in traditionally taught courses with or without review. Students in the traditional classes have approximately the same percentage of "Ds" as telecourse students. Perhaps telecourse students have a difficult time disciplining themselves into maintaining a schedule to complete learning activities, thus they receive lower grades or choose to withdraw. Conceivably, telecourse students who think they are not passing prefer to withdraw rather than risk receiving a low grade.

### Research Question Two

How does student withdrawal rate in televised computer applications courses compare with student withdrawal in traditional computer courses?



Data on course completion and withdrawal percentage figures displayed in Table 8 and Table 9 revealed higher withdrawal rates in telecourse classes. Both collegewide telecourse and traditional withdrawals and the researcher's course data indicated withdrawals were higher among telecourse students. This is consistent with other research data. Cheng, Lehman, and Armstrong (1991) found that withdrawal and non-completion were typically high in telecourses.

There are various reasons students have given the researcher for withdrawing from a course. Students have indicated there is not enough time to study, therefore, a withdrawal form was filed. Also, students have shared they would prefer withdrawal to the possibility of receiving a grade that is lower than desired from the course. There are also unexpected illnesses, job changes or moves, and family responsibilities which have prompted withdrawals.

### Research Question Three

Would student grades in telecourse and traditional courses improve with the addition of review sessions?

The data analyses in Table 11 revealed there were significant differences ( $p < .06$ ) in terms of the review effect on grades. Results confirmed that review sessions did, in fact, impact student grades in both telecourse and traditional courses. When mean scores for the groups were



examined, those students reviewed had a combined mean score of 2.46, students not reviewed had a mean score of 2.01.

Dempster (1991) noted research suggested spaced reviews could foster time-on-task, help students develop and sustain positive attitudes toward school and learning, and encourage constructive thinking and deeper understanding of the topic. O'Donnell and Dansereau (1993) reported the effects of cooperative and individual review of lecture material on subsequent free recall performance studied with 109 undergraduate students found that the direction of mean score differences suggested cooperative review can be effective.

Parrott (1995) reported research studies from 1992 and 1993 with respect to student outcomes also found no significant difference in GPA between traditional and distance learning students, though evidence did exist that course completion rates were higher in traditional sections. Evidence gathered from the researcher's study confirmed completion rates were higher in traditional classes as well.

Although review sessions appeared to help both the telecourse and traditionally taught students, the mean score for the traditionally taught non-review group was 2.25, very close to the mean ( $\bar{x} = 2.34$ ) of the reviewed telecourse students. Thus, traditionally taught students seem to do better than telecourse students regardless of review. Perhaps this is related to natural interactions which take



place in classes. Students in the classroom environment are able to obtain immediate response to a confirmation of ideas from verbal and nonverbal queues.

#### Research Question Four

Would student retention in computer applications telecourse and traditional courses improve with the addition of review sessions?

Student retention figures reflected higher retention figures in the traditionally taught control group (58.4%) as compared with the telecourse control group (43.5%) as measured by A, B, C grades. After review sessions were conducted, the traditionally taught experimental group (67.2%) and telecourse experimental group (55.6%) had notable improvements.

Review sessions served both (traditional and telecourse) groups as a conceptual basis of information which may have confirmed ideas and concepts studied, or it may have targeted overlooked information students may have missed as they advanced through coursework material. Students were better able to discern information considered meaningful as outlined in the course objectives being assessed. Reviews served as a repetition of content with a confirmation of existing ideas, and the opportunity to address misunderstood concepts.



### Research Question Five

What are student reactions to review sessions?

Both groups indicated a strong favorable perception of the course which may be due to the fact that this is a practical course meeting a requirement for many programs of study. Because the class content is based on computer software applications, it may be students from both (traditional and telecourse) groups found a skill-based course appealing.

A high rating of teacher perception from both (traditional and telecourse) respondent groups may be due to the fact that non-respondents may have been students who did not find aspects of the course or teacher favorable, and did not submit a questionnaire response. Or, perhaps, those students from both groups (traditional and telecourse) who did respond, found the teacher open and flexible with regard to assistance.

Student attitude about the course offered via television received interesting responses. Fifty-four percent of the traditionally taught respondents were uncertain about this course offered via television. Perhaps student respondents in the traditional group have not taken a distance education course. Interestingly, 62.5% of the telecourse respondents found the course helpful with 31.3% who reported it as uncertain. Results reflected respondents in the telecourse had a positive attitude about the course



via television, however, there were those who felt uncertain. For telecourse student respondents who rated the class as uncertain via television, perhaps this was their first course taken via distance learning. Also, due to the nature of the content of this course, computer applications, students may not have developed a comfort level with the course content. Perhaps if the content of the course was not skill oriented, students may have responded with less uncertainty.

There were favorable respondent percentages from both groups (traditional and telecourse) to this class offered via traditional method of instruction. Seventy-three percent of traditionally taught respondents found this class helpful or above, and 74% telecourse respondents indicated the course was helpful via the traditional method of instruction. Perhaps this is a result of the fact that all students have been enrolled in traditionally taught classes, whereas, not all students have enrolled in telecourses. The percentage of uncertainty to this class offered via traditional method of instruction was reported by 16% traditionally taught students, and 12.5% telecourse students. Possibly, the content of the course, as a skill based course, entered into student uncertainty. Perhaps respondents are not certain whether either method of instruction would make a difference with this course, or there may be that other factors, yet to be identified, that



students consider when making their decisions about course selection.

Based on student responses to the survey and interviews conducted, both groups liked review sessions. More telecourse student respondents (87%) indicated the value of review. Since review for them was optional and students could choose to access the taped reviews, maybe those students who accessed review completed the surveys and those who did not access reviews did not turn in a survey. Or, since not all students returned questionnaires, perhaps others in telecourses who did not like reviews were among non-respondents. Fifty-seven percent of the traditionally taught respondents indicated that they favored reviews. Telecourse student respondents had no one who indicated unfavorable perceptions of the review sessions, but 28% of the traditional course respondents found the reviews not helpful or boring. Again, due to traditionally taught students being forced into reviews as part of course presentation, some students responded honestly and unfavorably to the reviews. Maybe these students understood the material, and did not want reviews. Since telecourse students all had access, but were not made to review, respondents may have felt there was flexibility in accessing the reviews.

Due to the fact that grades in the experiment group were higher than those in the control group, review sessions



may have assisted students to achieve a higher grade than they would have had without reviews. Somewhat surprisingly 23.1% found the reviews as not helpful or boring. These responses may have been from students who already had a strong foundation in computer concepts or who expected entertainment value in televised programming.

Overall student estimated average hours of study per week for both groups had similar percentages. Traditionally taught respondents (81%) reported they spent 0-6 hours per week studying while the telecourse group (87%) also spent 0-6 hours per week studying. Study time was reported for class activities on a weekly basis.

Traditionally taught student respondents (47%) used the lab more than telecourse student respondents (19%). Study preferences, however, reflected that traditionally taught students (81%) used the lab and/or their own computer, and telecourse respondents used their own computer or a combination of lab/their own computer (81%). These overall figures suggest students appear to have access to a computer at multiple locations, however, availability of the lab for all students during study hours is necessary.

### Interviews

Interviewed students were selected from traditional and telecourse experimental classes taught Fall Term, 1996. Selections of students for interviewing was made based on



the desire to balance responses from among representative college students--there was one white male in his forties; one black male in his thirties; one white female (hispanic) in her twenties; two white females (non-hispanic) in their twenties; one black female in her thirties. Students expressed a willingness to be a part of the study. Tape recorded interview sessions were not viewed as intrusive.

Students communicated readily to questions posed. All students found that computer applications was considered an important class. Even though it was required by all students for their programs of study, they believed in this age of technology, everyone should know how to use a computer.

When method of instruction was posed to interviewees, definite opinions were expressed. Those enrolled in the traditionally taught class did not have an interest in the telecourse method. In addition, one of the telecourse students would not be enrolling in telecourse classes in the future. The other two telecourse students found this method of instruction in keeping with what they anticipated, and they looked forward to other courses via distance education. It may be that students who have not been exposed to distance education, have apprehensions about their taking a course via distance learning. They may feel that for themselves it is not how they prefer to participate in courses.



Interviewed students estimated their GPA at 4.0, 3.0, or 2.0. These students were conscientious, and they all felt that grades were important. Interviewed students had a program of study they had declared as their major, and they had plans for future employment and education. These students were definitely focused and had defined goals for themselves.

Both telecourse and traditionally taught students felt reviews were valuable. They felt that reviews gave them the opportunity to check their understanding of the material. Traditionally taught interviewees were not totally comfortable with being videotaped during reviews. Telecourse interviewees appreciated the taped review sessions.

Due to the importance of grades and overall GPA, it is not surprising to find that had several interviewed students had withdrawn from a college course. Three students volunteered that they had withdrawn from a course during their college career. Students who had not withdrawn from courses may not have experienced the possibility of receiving a low grade.

### Conclusions

Combined interaction of method of instruction and review was not a significant predictor of achievement in traditional and telecourse classes.



The method of instruction was not a significant predictor of achievement in traditional and telecourse computer applications. This is encouraging to those administrators who are expanding distance learning options in higher education. Based on the results of this study, telecourse instruction may be acceptable to traditional on-campus instruction for students.

The effect of review sessions was a significant predictor of achievement in traditional and telecourse computer applications classes. This would indicate that reviews provided students with an opportunity to improve grades and may have an effect on the number of withdrawals from the computer applications courses.

Questionnaire responses and in-depth interviews helped to explain perceptions about the method of instruction and review sessions in computer applications classes. Although method of instruction was not found to be statistically significant, students do have definite opinions regarding the method of instruction offered to suit their individual style of learning. Students in the telecourse classes were willing to project the value of the class if taught in a traditional way and vice versa. This might be more a reflection of preference than fact. Consideration should be given to maintain and expand methods of instruction to better meet the learning needs of students. Not all students may want to learn in a distance format, or feel



comfortable using that format. Similarly, traditionally taught classes may not meet the needs of students. Access to a variety of delivery systems is an important consideration for all colleges.

In addition, student responses to the survey from telecourse and traditional classes regarding review substantiated quantitative data that reviews did improve student achievement. Interviewees further confirmed the effectiveness of review sessions for academic achievement. Based on results of this study, educators who are considering using reviews should proceed with carefully planned and spaced reviews which promote student learning.

#### Recommendations for Further Research

##### Recommendations for Brevard Community College

Brevard Community College has expanded telecourse and other distance learning options to provide and expand access to the community of learners. The following recommendations were based on the analysis of the data and related research and literature:

1. Encourage use of review sessions as a means to improve student achievement and retention in both traditionally taught and telecourse classes.
2. Continue to explore the expansion of offerings to students through a variety of methods, including distance learning, to assure access of education to the community.



3. Continue to examine student attitudes regarding distance education and traditional instruction, particularly related to a variety of content areas, e.g., engineering, psychology, literature, communications.
4. Participate in research activities related to telecourse and traditional instruction.
3. Comparison of like courses should provide guidance for institutions beginning new programs or for colleges with existing distance education programs.

#### Recommendations for Further Research

This study demonstrated that review sessions impacted student achievement and retention in traditional and telecourse classes. Though results of this study were encouraging, additional research recommended for further study include:

1. Duplication of this study should be considered.
5. Results of this study proved that review sessions were effective in improving academic performance and retention. However, since no other studies relating to a comparison of traditionally taught and telecourse classes had been conducted, more research needs to be done to determine if content effects achievement in courses taught by these two



methodologies, e.g., literature, psychology, mathematics, skills-based and non-skilled based classes.

2. Research should be expanded to other analogous courses being offered via traditional and distance education for comparison of achievement and retention.
3. Since demographic information was limited in this study, more research needs to be done on effects of demographics on student preferences or success in distance and traditional classes.
4. Future studies should incorporate expanded face-to-face interviews in order to explore in-depth student preferences for telecourse and/or traditional classes, specifically, why they have such preferences--habit, fear, need.

Questionnaire responses were helpful, but in depth interviews give insight into additional topics relevant to the study being conducted.

5. Future research should consider various other review strategies that may be employed with traditional and distance education methods.



CGS 1530 Microcomputer Application Processing

Meeting: Monday Afternoon Instructor: C. Bourke  
Time: 1:00 - 3:45 Appendix A Office: BC-138  
Room: BC-134 Phone: 632-1111 X63520

CGS 1530 Syllabus Sample

**COURSE DESCRIPTION** An introductory course in the application of commercially available software for microcomputers -- topics include: word processing, spreadsheets, and data base programs.

**CREDIT** Three Semester Hours

**TEXT AND SUPPLIES** Microsoft Office 4.3 running under Windows 95  
Introductory Concepts and Techniques.  
Windows 95, Word 6, Excel 5, Access 2, & Powerpoint 4. Authors-Shelly, Cashman, & Vermaat. Published by Boyd and Fraser, ITP.

Two folders with pockets.  
One disk - 3 1/2" double sided, high density.

**ATTENDANCE** Fall Term begins Monday, August 26, 1996.  
The last day to drop with a refund of fees or change to audit status is Friday, August 26, 1994. Students will perform a variety of functions during class time. The student will need to allow a minimum of three hours per week of individual lab time other than class time to complete assigned tasks. Students are responsible for making up any missed text or homework assignment. Make-up tests need to be scheduled within one week. Late homework assignments must be submitted within one week in order to receive a maximum of one-half credit.

**WITHDRAWAL** It is the student's responsibility to initiate and complete the withdrawal form. If a student stops attending class and does not officially withdraw and has not completed the course work, the instructor will record an "F" grade at the end of the term. The withdrawal deadline is October 21, 1996.

**PROCEDURES** Students need to bring a notebook and pen or pencil to class. Notes concerning the



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EVALUATION

programs will assist the student when the student is working independently. The more a student works with the program, the more comfortable the student will feel using the program.

OBJECTIVES

To give students an opportunity to achieve a basic understanding of computer applications programs and to acquaint the student with basic operating system and hardware considerations so that they may apply concepts learned in the applications programs.

COMPETENCIES

Upon successful completion of this course the student will:

1. have a knowledge of hardware operations of the microcomputer.
2. demonstrate selected operating system functions through Windows.
3. perform tasks in a word processing application program which include the following--create and edit a document; use wizards to create a document; move, search, and replace text; format a document and change document formats; preview a document and use the thesaurus.
4. perform tasks in a spreadsheet application program which include the following--build a worksheet, formulas, format and create charts; print a worksheet; enhance a worksheet and chart; edit, save, and preview a worksheet.
5. share data and graphics between applications through object linking and embedding (OLE).
6. perform tasks in a database application which include the following--create a database; query a database; and maintain a database.
7. perform tasks in a presentation application which include the following--build a slide presentation; create a



# CGS 1530 SYLLABUS

## EVALUATION

presentation outline view; and enhance a presentation and add graphs and tables.

### Projects & Assignments - 50%

90% - 100% = A

80% - 89% = B

70% - 79% = C

60% - 69% = D

Points will be assigned to each assignment. The total number of points earned will be converted to a percentage.

### Textbook Tests - 40%

90% - 100% = A

80% - 89% = B

70% - 79% = C

60% - 69% = D

### Final Exam - 10%

Scale Same as Above

## TENTATIVE SCHEDULE

### WEEK

1 AUG 26

Introduction  
Intro. to Computers (COM 1-32)  
Microsoft Windows 95 Project 1 (WIN 1-53)  
Student Assignment 3

2 SEP 2

Labor Day HOLIDAY

3 SEP 9

Microsoft Windows 95 Project 2 (WIN 58-96)  
**Review for Test 1 (Intro, Windows Project 1 & 2)**

11 NOV 4

MO Project 1 (MO 1-16)  
Word 6 Project 1 (MSW 1-65)

4 SEP 16

**TEST 1**  
Project 1 continued--Print 1(Fig 1-67); Print 2 Computer Laboratory Assignment 4.  
Word 6 Project 2 (MSW 66-123)  
Project 2 continued--Print the cover letter and resume (Fig 2-43 & Fig 2-73); create your own letterhead; create your resume.



CGS 1530 SYLLABUS

- 5 SEP 23 Word 6 Project 3 (MSW 124-176)  
Project 3 continued--Print original & revised research paper. Extra credit--research paper for another class prepared in Word 6.  
**Review for Test 2 (Microsoft Office & Word)**
- 6 SEP 30 **TEST 2**  
Excel 5 Project 1 (E 1- 65)  
Print 1 (Fig 1-69); Computer Laboratory Assignment 1 --you may use this data or use own data.
- 7 OCT 7 Excel 5 Project 2 (E 66-134)  
Project 2 continued  
Project 2 Print 1--worksheet & graph (Fig 2-81); Print 2--section of worksheet (Fig 2-83); Print 3--cell formulas (Fig 2-86);  
Computer Laboratory Exercise 2--Prints 4, 5, 6 & 7.
- 8 OCT 14 Excel Project 3 (E 135-208)  
Project 3 continued  
Print 1--workbook (worksheet and pie chart, Fig 3-76), Computer Laboratory Assignment 3--Instructions Part 1--prints 2 & 3, Instructions Part 2--print 4
- 9 OCT 21 Object Linking Embedding (OLE) Project 1 (OLE 1-32)  
Project 1--Print 1-Memorandum with chart embedded, Computer Laboratory Exercise 2  
Review for Test 3 on Excel & OLE
- 10 OCT 28 **TEST 3 Excel & OLE**  
Access Project 1--Creating a Database (A 1-62)  
Project 1 continued
- 11 NOV 4 Project 1--Print 1 Contents of Table (Fig 1-39), Graph (Fig 1-78); Prints 2, 3, & 4  
Computer Laboratory Assignment 2  
Project 2--Querying a Database (A 63-122)  
Project 2 continued
- 12 NOV 11 NO SCHOOL - VETERANS' DAY  
Prints 1-18 Print all query runs in Project 2  
Computer Laboratory Exercise 2



CGS 1530 SYLLABUS

Project 3 continued  
Print 1--Fig 3-81, Prints 2, 3, 4, & 5--  
Computer Laboratory Assignment 2

- 14 NOV 25      Powerpoint Project 1 (PP 1-68)  
                 Printing the Presentation
- 15 DEC 2        Powerpoint Project 2 (PP 69-134)  
                 Powerpoint Project 3 (PP 135-192) Create your  
                 own slide presentation  
                 Review for Access & Powerpoint Test
- 16 DEC 9        **TEST 4 - ACCESS & POWERPOINT**  
                 REVIEW FOR FINAL EXAMINATION

FINAL EXAM - MONDAY, DECEMBER 16, 1996, 8:00 A.M. IN BC-134.



Appendix B  
Review Session Sample



## REVIEW SESSION 1

### INTRODUCTION TO COMPUTERS WINDOWS 95 (PROJECT 1 & 2)

#### INTRODUCTION TO COMPUTERS

1. Computer - An electronic device operating under the control of instructions stored in its own memory that can accept data (input), process data arithmetically and logically, produce output from the processing and store the results for future use.
2. Information processing cycle also called four basic computer operations - Input, process, output & storage.
3. Data - Raw facts, including numbers, words, images, and sounds, given to a computer during the input operation.
4. Information - Data processed into a form that has meaning and is useful.
5. Components of the computer -
  - A. Input device
    1. Keyboard - Enter data into main memory
    2. Mouse - Pointing device used instead of control keys.
  - B. Processor unit
    1. Central processing unit (CPU) causes processing to occur--interprets instructions to the computer, performs logical and arithmetic processing operations, and causes output
    2. Main memory (RAM) also called random access memory consists of electronic components that store data including numbers, letters of the alphabet, graphics, and sound. Measurements of main memory are typically in kilobytes (K or KB) 1,000 memory locations or megabytes (M or MB) 1 million memory locations. A byte usually stores one character.
  - C. Output device-makes information available for use
    1. Printers
      - a. Impact-Dot matrix
      - b. Nonimpact-Ink jet sprays ink forming characters; or laser converting data from the computer into a beam of light that is focused on a photoconductor drum forming the images to be printed.



2. Computer screen
  - a. Screen
  - b. Monitor
  - c. Liquid crystal display (LCD)
  - d. CRT (Cathode ray tube)
- D. Auxiliary Storage
  1. Floppy disks
    - a. 5 1/4" DS/DD DS/HD
    - b. 3 1/2" DS/DD DS/HD
      1. Recording density is stated in bits per inch (bpi)--number of magnetic sports that can be recorded on a floppy disk in a one-inch circumference of the innermost track
      2. Track is a very narrow recording band forming a full circle around the disk
      3. Sector is a pre-shaped section of the disk.
      4. Access time is the time required to retrieve data--varies from 175 milliseconds to 300 milliseconds.
    - c. Write-protect-window is open; non-protected-window is closed
  2. Hard disk--one or more rigid metal platter coated with a metal oxide material that allows data to be magnetically recorded on the surface of the platters.
  3. CD-ROM-Compact disk read-only memory store large amounts of prerecorded information typically 600 million bytes of data which is the equivalent of 300,000 pages of text.
6. Computer Software
  - A. System software--programs controlling the operations of the computer. Important part of systems software is the operating system which tells the computer how to perform the functions of loading, storing, and executing an application and how to transfer data. Booting is the process when a computer is started and the operating systems is loaded into the computer. Many computers today have a GUI (Graphical user interface) that provides visual clues such as icon symbols to help the user.
  - B. Application software
    1. Word processing--Documents such as letters, memos
    2. Electronic spreadsheet--Mathematical operations
    3. Database software--Organized data
    4. Presentation graphics--Slides for presenting



5. Communications software--Transmit data and information from one computer to another.
6. Electronic mail software--Send messages to and receive message from other computers
7. Communications
  - A. Communications channels-path the data follows as it is transmitted from the sending equipment to the receiving equipment. Channels are made up of one or more transmission media.
  - B. Communications Equipment
    1. Digital Signals-electrical pulses grouped together to represent characters.
    2. Analog Signals-Voice transmission which is comprised of a continuous electrical wave.
    3. Modem-converts the digital signals of a computer to analog signals.
  - C. Local Area Networks (LANs)--Privately owned communications network and covers a limited geographic area.
  - D. Wide Area Networks (WANs)--Geographic in scope and uses telephone lines, microwave, satellites or a combination of communications channels.
8. Purchasing your computer
  - A. Applications you use
  - B. Choose software
  - C. Watch hidden costs
  - D. Energy savers
  - E. Comparison shopping
  - F. Price local & direct mail
  - G. Consider more than price
  - H. Look for free software
  - I. Compatibility
  - J. Agreements--on-site
  - K. Last for three years.

#### WINDOWS 95 (PROJECT 1)

1. Microsoft Windows 95-a complete operating system that performs every function necessary for you to communicate with and use your computer. It is a 32-bit operating system designed to be compatible with all existing applications programs.
2. User Interface-combination of hardware and software that you use to communicate with and control your computer.
3. (MOM)Microsoft Office Manager allows you to start Microsoft Office applications programs and switch between those applications programs. Nearly every item on the Windows 95 desktop is considered an object, and



- every object has properties. Example--The properties of an object may be the color of the object.
4. Communicating with Microsoft Windows 95
    - A. Mouse--point and click--one click highlights icon (left button)
    - B. Double click--opens the window
    - C. Menu bar--horizontal bar below the title bar of a window
    - D. Folders--objects created to contain related documents, applications, and other folders.
    - E. Buttons--Maximize & restore; minimize; close
    - F. Moving & sizing an object by dragging
    - G. Opening an application
    - H. Saving a document
    - I. Using Windows Help; shutting down windows

#### WINDOWS 95 (PROJECT 2)

1. Windows explorer--Applications program included with Windows 95 that allows you to view the contents of the computer.
2. Right-click to open a context-sensitive menu, then point to explore command on the menu.
3. Display the contents of a folder
4. Expand a folder--Click the plus sign to the left of icon
5. Collapse a folder--Click the minus sign to the left of icon
6. Create a new folder--Click the folder or area where new folder is to be created; place pointer in contents area and click right button to open a context-sensitive menu; go to New and click; then type in name for folder
7. Expand multiple folders--click the plus sign to left of icon; repeat on selected submenu icons where there is a plus sign
8. Change to list view--right click any open area in the contents side of the exploring window to obtain a context-sensitive menu, then point to List on the submenu and click
9. Copying files--highlight file to be copied; right drag the file over to the desired folder and release the right mouse button to open a context-sensitive menu and point to copy here command and click
10. Renaming files--point to a filename in the contents side and click twice (not a double click) type name and enter.
11. Rename a folder--point to folder name; click twice (not a double click); type in name and press enter
12. Deleting files or folders--right click filename and point to the delete command on the context-sensitive menu and click; click Yes to confirm. You can delete by right-dragging filename over to the recycle bin icon



- and point to move here command; click move here on context sensitive menu and confirm file delete.
13. Copying a disk-right click folder name and point to the copy disk command on the context sensitive menu; click copy disk, start and OK. You will insert the source in Drive a (what is to be copied); then you will be instructed to insert the destination disk (where copied items are to go); when the copy is completed point to the close and click
  14. Formatting a disk-Click on My computer icon, click on 3 ½" disk, Click on File Menu, drop down to format and select the appropriate disk density and then format



Appendix C  
Student Survey



## SURVEY OF COMPUTER APPLICATIONS

Please mark an X on the line that applies to the course you are currently enrolled for computer applications.

Traditional \_\_\_\_\_  
 Telecourse \_\_\_\_\_

Please mark the appropriate line.

Male \_\_\_\_\_  
 Female \_\_\_\_\_

**Age Group** Please place an X on the line that fits your category.

17 - 24 \_\_\_\_\_  
 46 - 65 \_\_\_\_\_  
 25 - 45 \_\_\_\_\_  
 66 & over \_\_\_\_\_

Please read each question and choose the response that best reflects how you feel about the statement using the scale given and mark your answers in the appropriate column.

Fantastic      Helpful      Uncertain      Not Helpful      Boring  
 1                      2                      3                      4                      5

1. What is your perception of this course?	1	2	3	4	5
2. What is your perception of the teacher?	1	2	3	4	5
3. What is your attitude about taking this class via television?	1	2	3	4	5
4. What is your attitude about taking this class via traditional mode?	1	2	3	4	5
5. What is your reaction to the review sessions?	1	2	3	4	5

6. \_\_\_\_\_ What are your average study hours per week spent on this class?

7. What is your study preference?  
 A. Use the computer lab  
 B. Use your own computer  
 C. Combination of lab and home computer

8. What is your occupational status?  
 A. Employed full-time  
 B. Employed part-time  
 C. Self-employed  
 D. Not employed



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